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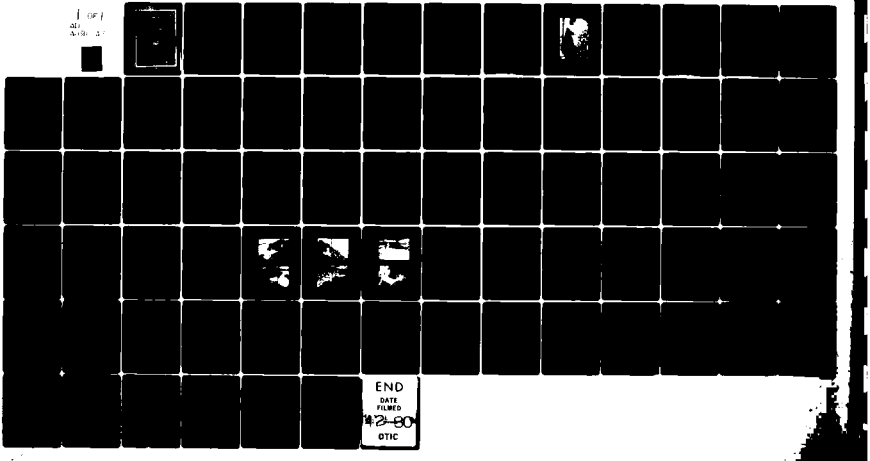

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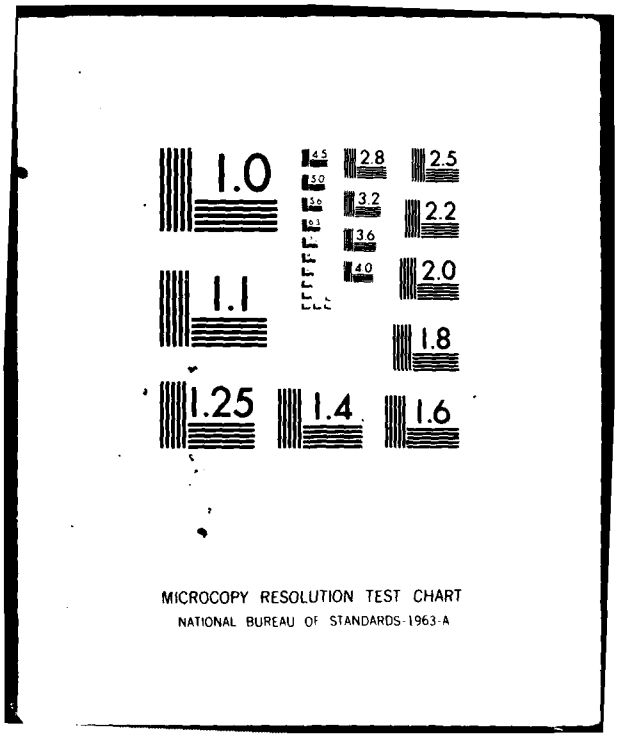
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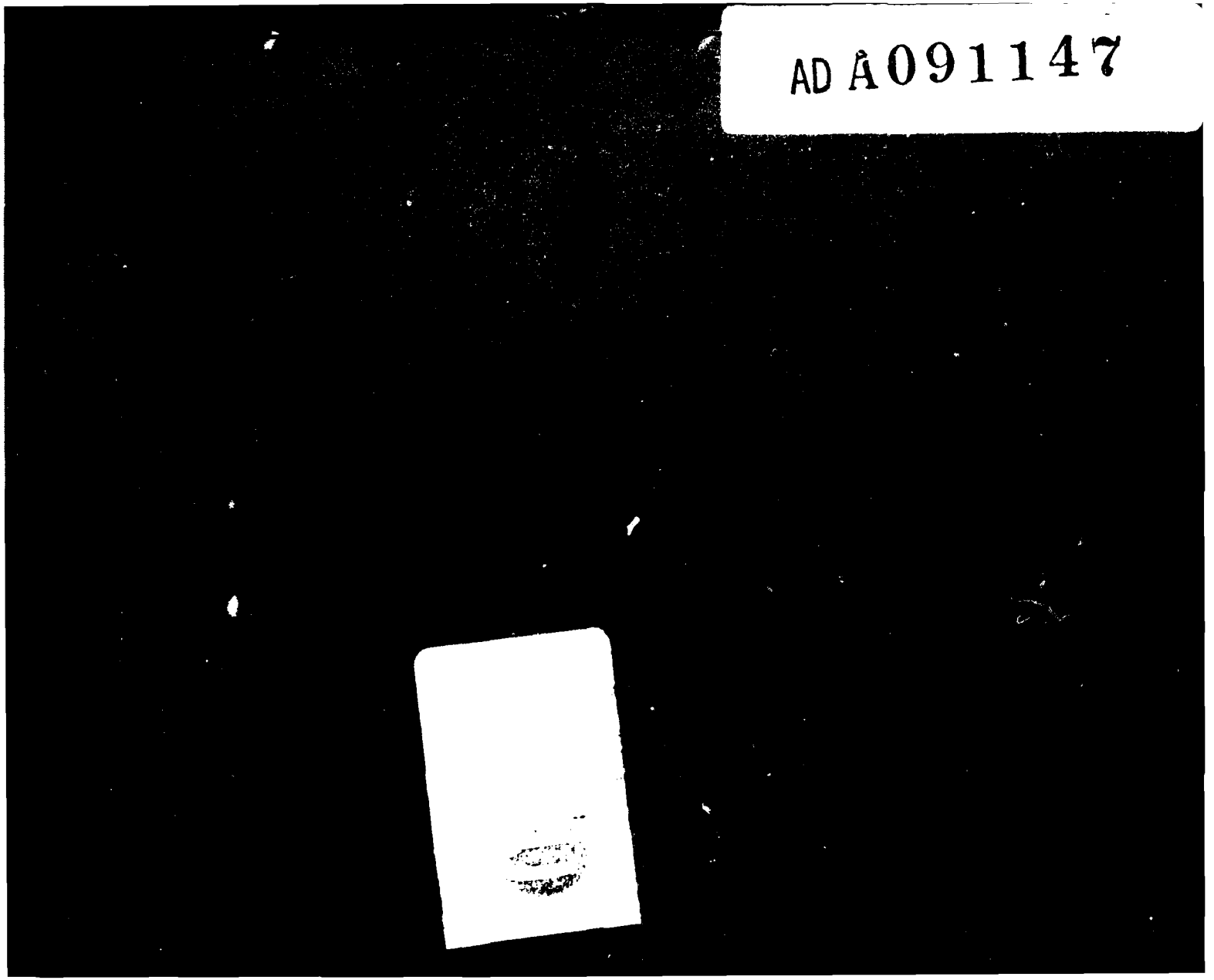

SUSQUEHANNA RIVER BASIN

LOWER LITTLE SWATARA CREEK, SCHUYLKILL COUNTY

PENNSYLVANIA

HAWK MOUNTAIN DAM

NDI ID No. PA-01129
DER ID No. 54-180

HAWK MOUNTAIN COUNCIL, INC.

BOY SCOUTS OF AMERICA

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM.

Hawk Mountain Dam (NDI ID Number PA-01129, DER ID Number 54-180) ~~Hawk Mountain Council, Inc. Boy Scouts of America~~. Susquehanna River Basin, Lower Little Swatara, Schuylkill County, Pennsylvania. Phase I Inspection Report.

Prepared by

GANNETT FLEMING CORDDRY AND CARPENTER, INC.
Consulting Engineers
P.O. Box 1963
Harrisburg, Pennsylvania 17105

For

DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

SUSQUEHANNA RIVER BASIN

LOWER LITTLE SWATARA CREEK, SCHUYLKILL COUNTY

PENNSYLVANIA

HAWK MOUNTAIN DAM

NDI ID No. PA-01129
DER ID No. 54-180

HAWK MOUNTAIN COUNCIL, INC.

BOY SCOUTS OF AMERICA

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

JULY 1980

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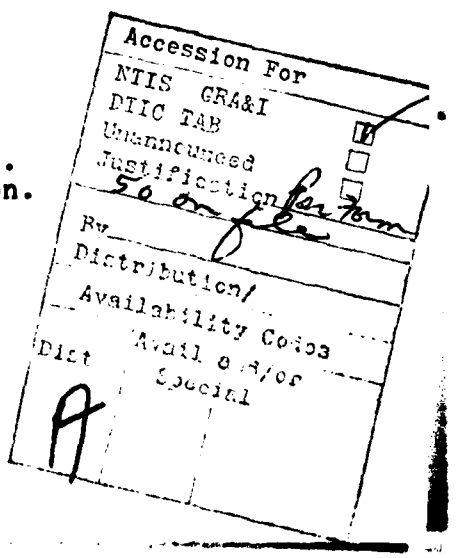


PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

BRIEF ASSESSMENT OF GENERAL CONDITION

AND

RECOMMENDED ACTION

Name of Dam:	Hawk Mountain Dam NDI ID No. PA-01129 DER ID No. 54-180
Size:	Small (35 feet high; 141 acre-ft)
Hazard Classification:	High
Owner:	Hawk Mountain Council, Inc. Boy Scouts of America 4903 Pottsville Pike Reading, PA 19605 ATTN: John Knight, Program Director
State Located:	Pennsylvania
County Located:	Schuylkill
Stream:	Lower Little Swatara Creek
Date of Inspection:	2 June 1980

Based on visual inspection, available records, calculations, past operational performance, and according to criteria established for these studies, Hawk Mountain Dam is judged to be in good condition. Based on the size and hazard classification of the dam, the Spillway Design Flood (SDF) at the dam varies between 1/2 the Probable Maximum Flood (PMF) and the PMF. Based on the downstream conditions, the selected SDF is the 1/2 PMF. The existing spillway will pass the PMF, which is twice the SDF, with 0.2 foot of freeboard. The spillway capacity is rated as adequate. If the low areas on the top of the dam were filled to the design elevation, the freeboard would increase to 0.6 foot.

No stability problems were evident during the visual inspection. A stability analysis performed during design indicates that the embankment has adequate factors of safety. The spillway weir has no significant deviations from the OCE guidelines for stability of gravity structures.

The following studies and remedial measures are recommended to be undertaken by the Owner, in approximate order of priority, without delay:

(1) As is presently being attempted, establish an adequate grass cover on the embankment.

(2) Visually monitor the seepage near the right abutment and at the spillway wingwall on a daily basis. If either significant changes in seepage or turbidity are noted, have the condition evaluated immediately by a professional engineer experienced in the design and construction of dams.

(3) Fill in the low areas at the top of the dam so that the embankment is at or above its design elevation.

(4) Since the outlet works conduit has not been inspected since its construction, have the conduit inspected. Particular attention should be paid to the joints to determine if there is an increase in joint openings.

In addition, the Owner should institute the following operational and maintenance procedures:

(1) Develop a detailed emergency operation and warning system.

(2) During periods of unusually heavy rains, provide round-the-clock surveillance of the dam.

(3) When warnings of a storm of major proportions are given by the National Weather Service, the Owner should activate his emergency operation and warning system.

(4) As presently required by the Commonwealth, initiate a program of formal annual inspections by a professional engineer experienced in the design and construction of dams. Utilize the inspection results to determine if remedial measures are necessary.

HAWK MOUNTAIN DAM

Submitted by:

GANNETT FLEMING CORDDRY
AND CARPENTER, INC.

FREDERICK FUTCHKO
Project Manager, Dam Section

Date: 8 August 1980

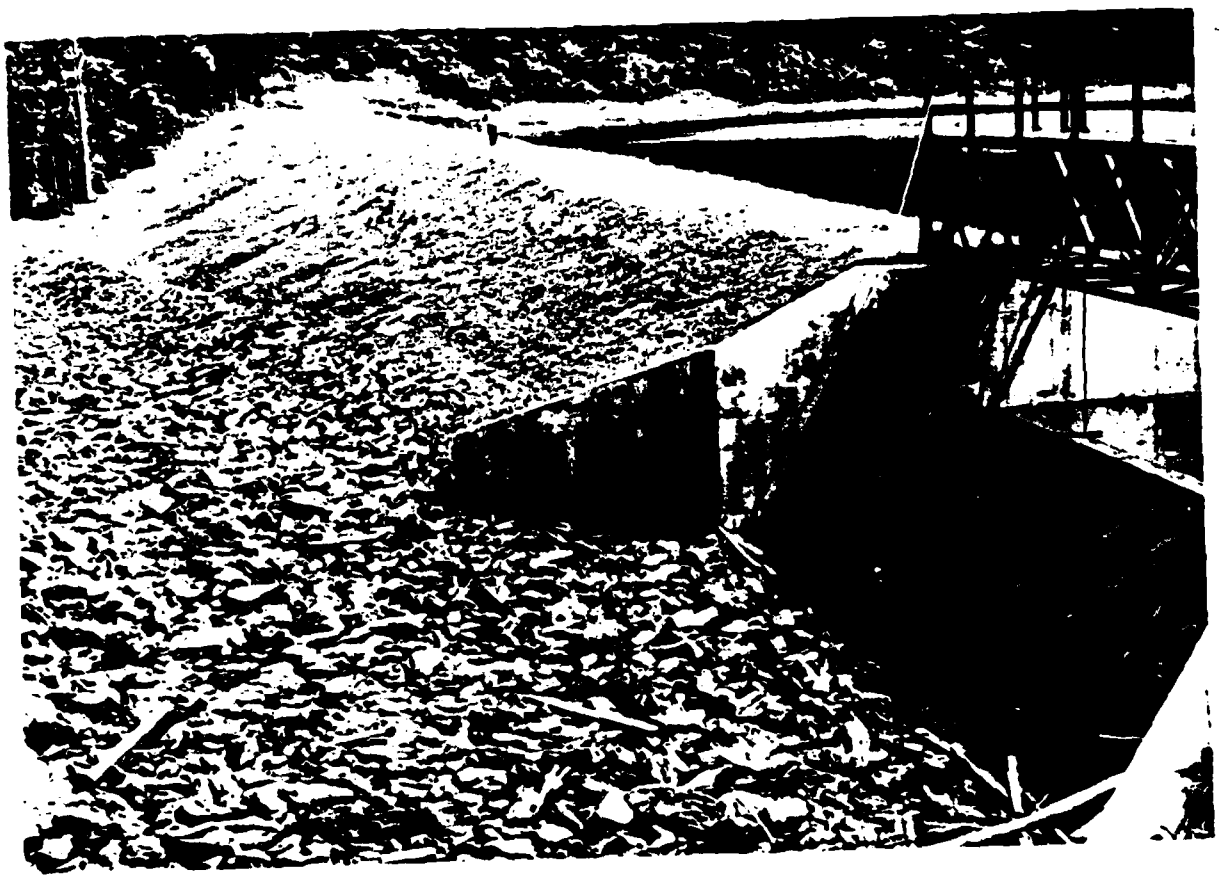
Approved by:

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT,
CORPS OF ENGINEERS

JAMES W. PECK
Colonel, Corps of Engineers
District Engineer

Date: 25 Sep 1980

HAWK MOUNTAIN DAM



Overview

SUSQUEHANNA RIVER BASIN

LOWER LITTLE SWATARA CREEK, SCHUYLKILL COUNTY

PENNSYLVANIA

HAWK MOUNTAIN DAM

NDI ID No. PA-01129
DER ID No. 54-180

HAWK MOUNTAIN COUNCIL, INC.

BOY SCOUTS OF AMERICA

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

JULY 1980

SECTION 1

PROJECT INFORMATION

1.1 General.

a. Authority. The Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspection of dams throughout the United States.

b. Purpose. The purpose of the inspection is to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project.

a. Dam and Appurtenances. Hawk Mountain Dam consists of an embankment, a spillway, and an outlet

works. The embankment is a homogeneous earthfill structure with a toe drain. It is 788 feet long and 35 feet high at maximum section.

The spillway is located at the left end of the dam. It is a concrete gravity weir. The crest is 50 feet long and 7.5 feet below the design top of the dam. A steel truss footbridge extends across the spillway. The spillway exit channel is protected by riprap and extends along the toe of the embankment.

The outlet works is a 16-inch diameter reinforced concrete pipe (RCP) located at the highest section of the dam. A sluice gate is at the upstream end of the pipe. An uncontrolled 2-inch diameter wrought iron pipe is used to maintain streamflow, and it discharges into the upstream end of the 16-inch diameter RCP. The various features of the dam are shown on the Photographs in Appendix C and on the Plates in Appendix E. A description of the geology is included in Appendix F.

b. Location. Hawk Mountain Dam is located on Lower Little Swatara Creek in Wayne Township, Schuylkill County, Pennsylvania, approximately 2 miles southwest of Summit Station. Hawk Mountain Dam is located on USGS Quadrangle, Friedensburg, Pennsylvania, at latitude N 40° 32' 35" and longitude W 76° 14' 10". A location map is shown on Plate E-1.

c. Size Classification. Small (35 feet high, 141 acre-feet).

d. Hazard Classification. High hazard. Downstream conditions indicate that a high hazard classification is warranted for Hawk Mountain Dam (Paragraphs 3.1e and 5.1c (5)).

e. Ownership. Hawk Mountain Council, Inc., Boy Scouts of America, 4903 Pottsville Pike, Reading, PA 19605, ATTN: John Knight, Program Director.

f. Purpose of Dam. Recreation.

g. Design and Construction History. Hawk Mountain Dam was designed during 1976 and 1977 by Gilbert/Commonwealth, engineers of Reading, Pennsylvania. Anthony J. Hurst was design engineer and J. M. Normann was project manager. The Commonwealth approved the design and issued a permit for construction in June 1977. Construc-

tion started in July 1977; the construction was performed by J. Robert Bazley, Inc., Contractor, under the supervision of Fred W. Wolf. Gilbert/Commonwealth inspected the construction. The construction was completed in November 1978.

h. Normal Operational Procedure. The pool is maintained at the spillway crest level with excess inflow discharging over the spillway. Low flow discharges are maintained downstream by continual releases through 2-inch diameter pipe at the outlet works. The emergency drawdown facilities are not normally used. Spillway discharge flows downstream in Lower Little Swatara Creek.

1.3 Pertinent Data.

a. Drainage Area. (square miles)	1.3
b. Discharge at Damsite. (cfs.)	
Maximum known flood at damsite	Unknown.
Outlet works at maximum pool elevation	24
Spillway capacity at maximum pool elevation	
Design conditions	3,900
Existing conditions	3,600
c. Elevation. (feet above msl.)	
Top of dam	
Design conditions	837.5
Existing conditions	837.1
Maximum pool	
Design conditions	837.5
Existing conditions	837.1
Normal pool (spillway crest)	830.0
Upstream invert outlet works	808.0
Downstream invert outlet works	803.4
Streambed at toe of dam	802.5
d. Reservoir Length. (miles)	
Normal pool	0.16
Maximum pool (design)	0.25
e. Storage. (acre-feet)	
Normal pool	61
Maximum pool (design)	147
Maximum pool (existing)	141

f.	Reservoir Surface. (acres)	
	Normal pool	9.1
	Maximum pool (design)	14.0
g.	Dam.	
	Type	Homogeneous earthfill with toe drain.
	Length (feet-embankment only)	788
	Height (feet)	35
	Topwidth (feet)	
	Design	15
	Existing	12
	Sides Slopes	
	Upstream	
	Design	1V on 2.5H
	Existing	1V on 2.4H
	Downstream	1V on 2.5H
	Zoning	Toe drain.
	Cut-off	Cut-off trench filled with embankment material.
	Grout Curtain	None.
h.	Diversion and Regulating Tunnel.	None.
i.	Spillway.	
	Type	Concrete gravity weir, trapezoidal in cross section.
	Length of Weir (feet)	50.0
	Crest Elevation	830.0

i.	Spillway. (continued) Upstream Channel	Short level channel submerged in reservoir.
	Downstream Channel	Riprapped channel along toe.
j.	Regulating Outlets. Type	One 16-inch diameter RCP with a 2-inch diameter wrought iron pipe discharging into it.
	Length (feet)	177.5
	Closure	16-inch sluice gate at upstream end. The operating mechanism extends along the upstream slope. There is no closure for the 2-inch diameter pipe.
	Access	Top of dam.

SECTION 2

ENGINEERING DATA

2.1 Design.

a. Data Available. Data available include design drawings, specifications, a slope stability summary, and a permit application report.

b. Design Features. The project is described in Paragraph 1.2a. The various features of the dam are shown on the Photographs in Appendix C and on the Plates in Appendix E.

c. Design Considerations. The specifications are detailed and generally reflect good engineering practice. Two items of minor concern were noted in the review of the design. The diameter of the outlet works conduit, while hydraulically adequate, is sufficiently small that it does not afford access to personnel. Weep holes are provided along the spillway approach walls. While these relieve differential hydrostatic pressure, they also prevent the wall from acting as an impervious barrier. As the holes are not interconnected by a drainage system, the concern is only minor.

2.2 Construction Data.

a. Data Available. The data available include detailed construction progress reports submitted to the Commonwealth, construction photographs, and brief reports prepared by the Commonwealth concerning certain conditions that arose during construction. Much of the data concerns environmental problems, which are not pertinent to the safety of the dam. Both revisions to the spillway exit channel and to the riprap size were determined to be necessary. The design engineer analyzed the changes before approving them.

Frequent reports on the results of compaction tests were made. If the specified density was not attained, in most cases it was noted that the material was removed and recompacted. Minor variations below the specified density requirement were, at least on one occasion, allowed to remain after the design engineer reviewed the data.

The reports indicate that the upper layer of fill to the left of the spillway was significantly below the specified density. The design engineer noted that access to the area was difficult for compaction equipment; he recommended that the material be left in place and conditions downstream of the fill be monitored for seepage after construction was completed and the reservoir was at normal pool.

b. Construction Considerations. The available data indicates that the dam was well-constructed.

2.3 Operation. There are no formal records of operation. The Owner maintains informal records and records pool elevations daily.

2.4 Evaluation.

a. Availability. Engineering data were provided by the Bureau of Dams and Waterway Management, Department of Environmental Resources, Commonwealth of Pennsylvania (PennDER) and the design engineer. The Owner made available personnel for information and an operating demonstration during the visual inspection. The design engineer researched his files for information at the request of the inspection team.

b. Adequacy. The type and amount of available design data and other engineering data are generally good, and the assessment is based on the combination of available data, visual inspection, performance history, hydrologic assumptions, and hydraulic assumptions.

c. Validity. There is no reason to question the validity of the available data.

SECTION 3

VISUAL INSPECTION

3.1 Findings.

a. General. The overall appearance of the dam is good. Some minor deficiencies were observed as noted below. A sketch of the dam with the locations of deficiencies is presented on Exhibit B-1 in Appendix B. Survey information acquired for this Report is summarized in Appendix B. Datum for the survey was taken at the main spillway crest, Elevation 830.0. On the day of the inspection, the pool was 0.1 foot above the spillway crest level.

b. Embankment. The embankment is in generally good condition. The only deficiency is the very poor growth of grass on the upper parts of the upstream and downstream slopes (Photographs A and B). Because the slopes are virtually unprotected, rainfall and surface runoff have eroded several very shallow swales in the nearly bare soil. Some of the soil has migrated onto the drain material on the downstream slope. A few very shallow swales have also been eroded into the drain material. The Owner reported that he has reseeded the embankment several times, but that grass has never grown well on the dam. At present he is restricting access, to avoid unnecessary foot traffic causing problems on the unprotected slopes.

The survey performed for this inspection reveals that the embankment is low adjacent to both spillway walls. The lowest area is 0.4 foot below the design elevation. A profile is shown in Appendix B. The survey also reveals that the existing cross section varies slightly from its design template, as shown in Appendix B.

The outfall of the toe drain was discharging clear water at about 1/4 gpm. At the right abutment, there was a clear seep of about 10 gpm; the seepage emanates from an area that is about 30 feet downstream from the embankment.

c. Appurtenant Structures. The outlet works is in good condition (Photographs C and D). The Owner opened the outlet works gate about 5 percent without any problems. The main spillway is in good condition

(Photographs A and E). The only deficiency observed at the area was significant seepage of about 2 gpm from one weephole at the left downstream wingwall (Photograph F). The spillway bridge is also in good condition. The spillway exit channel is protected by large riprap, which is in good condition.

d. Reservoir Area. The watershed is mostly steep and wooded. The only development within it is the Boy Scout Camp development. Part of this development is a small dam (Photograph H).

e. Downstream Conditions. At the dam, the downstream channel is clear. From the dam, the stream flows for about 1.1 miles to a small culvert beneath a road. About 1,200 feet upstream from the road is a low-lying dwelling adjacent to the stream. Immediately downstream from the road is a trailer immediately adjacent to the stream. Beyond this, the flood plain broadens significantly to about 0.4 mile in width. Although there are some dwellings and two commercial off-stream fishing ponds, only the fishing ponds are immediately adjacent to the stream.

SECTION 4

OPERATIONAL PROCEDURES

4.1 Procedure. The reservoir is maintained at spillway crest, with excess inflow discharging over the spillway and into Lower Little Swatara Creek. Streamflow is maintained during periods of low flow by the uncontrolled 2-inch diameter pipe that discharges into the outlet works conduit. The emergency drawdown facilities are normally not used.

4.2 Maintenance of Dam. The dam is visited daily by the maintenance supervisor who records the reservoir elevation. Annual reports of reservoir elevations are mailed to the Commonwealth. The maintenance supervisor is also responsible for observing the general condition of the dam and appurtenant structures and reporting any changes or deficiencies to the Owner. Formal inspections of the dam are not made.

4.3 Maintenance of Operating Facilities. The emergency drawdown valve is visually inspected periodically and greased when needed. The Owner has had divers inspect the intake structure twice since construction was completed to ensure that the intake was clear of debris.

4.4 Warning Systems in Effect. There is no emergency operation and warning system.

4.5 Evaluation of Operational Adequacy. The maintenance of the dam is good. The daily inspection program for the dam is good. A program of formal annual inspections is necessary to detect potentially hazardous conditions at the dam. A detailed emergency operation and warning system is necessary to reduce the risk of dam failure should adverse conditions develop and to prevent loss of life should the dam fail.

SECTION 5

HYDROLOGY AND HYDRAULICS

5.1 Evaluation of Features.

a. Design Data. The Design Engineer indicated that the Commonwealth's Curve "C" was the basis for designing the spillway capacity. The Commonwealth's analysis of the design indicated that the dam could pass the Curve "C" discharge of 1,870 cfs with 3 feet of freeboard. This was estimated using a drainage area of 1.40 square miles. The analysis described hereafter uses the maximum available head to determine spillway capacity.

Plate E-2 indicates that the design engineer determined the drainage area to be 1.42 square mile. The drainage area was checked using recent USGS mapping and was found to be 1.34 square miles, which is used in this Report. From the mapping, it appeared that the north-eastern corner of the area shown on Plate E-2 actually drained into another watershed. The USGS mapping of this area was visually confirmed during the field inspection.

b. Experience Data. The Owner reported that the highest pool since the dam was constructed was only 2 to 3 inches above spillway crest. These are too small to be considered a flood.

c. Visual Observations.

(1) General. The visual inspection of Hawk Mountain Dam, which is described in Section 3, resulted in a number of observations relevant to hydrology and hydraulics. These observations are evaluated herein for the various features.

(2) Embankment. The low areas on the top of the embankment limits the existing spillway capacity to less than the maximum capacity.

(3) Appurtenant Structures. No deficiencies relevant to hydraulics were observed at the spillway, or the spillway exit channel. The spillway bridge has the potential to collect debris when the pool is near maximum level. This would reduce the spillway capacity. Its effects have not been included in the analysis described hereafter.

No deficiencies relevant to hydraulics were observed at the outlet works. The sluice gate provides an upstream closure facility.

(4) Reservoir Area. A negligible amount of rural development is in the watershed. The impoundment of the small dam in the watershed is described by the Owner as being knee deep at normal pool. The dam is sufficiently small that it would have no significant effect on the hydrology at the Hawk Mountain damsite.

(5) Downstream Conditions. No conditions were observed downstream from the dam that would reduce the spillway discharge capacity. Failure of Hawk Mountain Dam would probably flood 1 dwelling as well as a trailer, with a resultant potential for loss of life. Property damage would occur further downstream. The downstream conditions indicate that a high hazard classification is warranted for Hawk Mountain Dam.

d. Overtopping Potential.

(1) Spillway Design Flood. According to the criteria established by the Office of the Chief of Engineers (OCE), the Spillway Design Flood (SDF) for the size (Small) and hazard potential (High) of Hawk Mountain Dam is between one-half of the Probable Maximum Flood (PMF) and the PMF. Because of the limited number of dwellings that would be flooded to a significant depth, the 1/2 PMF is selected as the SDF for Hawk Mountain Dam. The watershed was modeled with the HEC-1DB computer program. A description of the model is included in Appendix D. The assessment of hydrology and hydraulics is based on existing conditions, and the effects of future development are not considered.

(2) Summary of Results. Pertinent results are tabulated at the end of Appendix D. The analysis reveals that Hawk Mountain Dam can pass the PMF with 0.2 foot of freeboard. The dam is rated at its existing top elevation. At its design top elevation, the freeboard would increase to 0.6 foot. During the SDF (1/2 PMF) the existing freeboard is 2.8 feet. Therefore, there is negligible potential for the spillway bridge to collect debris during the 1/2 PMF.

(3) Spillway Adequacy. The criteria used to rate the spillway adequacy of a dam are described in Appendix D. Because Hawk Mountain Dam can pass the PMF, which is twice the SDF, the spillway capacity of Hawk Mountain Dam is rated as adequate.

SECTION 6

STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability.

a. Visual Observations.

(1) General. The visual inspection of Hawk Mountain Dam, which is described in Section 3, resulted in a number of observations relevant to structural stability. These observations are evaluated herein for the various features.

(2) Embankment. The Owner is aware of the consequences of the poor growth of grass on the embankment and he is trying to remedy the situation. The flow at the outfall of the toe drain is not excessive and is of no concern. The seepage at the right abutment of the dam is probably from a spring. As shown on Plate E-2, springs were reported in the area before construction of the dam began. In a letter to the Owner, PennDER stated that an inspector from the Commonwealth had observed the flow during an inspection in August 1979; PennDER recommended that the flow be monitored.

(3) Appurtenant Structures.

No deficiencies were observed at the outlet works. Because of its small size, it was not possible to inspect the interior of the outlet conduit. The design engineer subsequently reported that the pipe had rubber and steel joints and was placed in 16-foot long laying lengths. Because the joints of pipes under embankments tend to separate and because the pipe has never been inspected since its construction, an inspection is warranted.

The only item of concern at the spillway is the seepage at the left wingwall. The design engineer has previously investigated the seepage and determined that the seeping water is conveying virtually no fines. This indicates that there is no piping potential at present; as noted on Plate E-5, filter material is placed behind the weephole. As noted in Paragraph 2.2a, the earthfill in this area did not meet the required density and the Design Engineer anticipated that there might be some seepage.

b. Design and Construction Data. A stability analysis was performed by the design engineer for the embankment. A summary of the results is in Appendix A. The stability analysis reveals that the factor of safety for steady seepage condition is 1.52 and for the sudden drawdown condition is 1.23. These factors of safety are adequate.

For this Report, an analysis of the stability of the weir was made at the maximum loading condition. Both earth pressure and uplift were considered. For this loading condition, with the pool at the top of the dam, the resultant is slightly outside the middle third but about 3.4 feet inside the toe. The resulting toe pressure and the resistance to sliding were found to be adequate for the assumed maximum loading condition. Although the spillway weir does not meet the guidelines of the Office of the Chief of Engineers (OCE) for stability under the assumed maximum loading conditions, the resultant being outside the middle third is not deemed to be a significant deviation because the toe pressure is not excessive.

c. Operating Records. There are no formal records of operation. According to available records, no stability problems have occurred over the operational history of the dam.

d. Post-construction Changes. There have been no post-construction changes to the dam.

e. Seismic Stability. Hawk Mountain Dam is located in Seismic Zone 1. Normally, it can be considered that if a dam in this zone has adequate factors of safety under static loading conditions, it can be assumed safe for any expected earthquake loading. Since the factors of safety are adequate, the dam is assumed to be stable for any expected earthquake loading.

SECTION 7

ASSESSMENT, RECOMMENDATIONS, AND PROPOSED REMEDIAL MEASURES

7.1 Dam Assessment.

a. Safety.

(1) Based on available records, visual inspection, calculations, and past operational performance, Hawk Mountain Dam is judged to be in good condition. Based on the size and hazard classification of the dam, the recommended SDF varies between the 1/2 PMF and the PMF. The selected SDF at the dam is the 1/2 PMF. Based on existing conditions, the spillway will pass the PMF with 0.2 foot of freeboard. If the low areas on the top of the embankment were filled to the design elevation, the freeboard would increase to 0.6 foot. For either condition, the spillway capacity is rated as adequate.

(2) No stability problems were evident during the visual inspection. A stability analysis performed during design indicates that the embankment has adequate factors of safety. The spillway weir has no significant deviations from the OCE guidelines for stability of gravity structures.

(3) A summary of the features and observed deficiencies is listed below:

Feature and Location	Observed Deficiency
Embankment:	Minor surface erosion because of poor growth of grass; seepage probably from spring near right abutment; low areas.
Spillway:	Significant seepage through one weephole.

b. Adequacy of Information. The information available is such that an assessment of the condition of the dam can be inferred from the combination of visual inspection, past performance, and computations performed prior to and as part of this study.

c. Urgency. The recommendations in Paragraph 7.2 should be implemented without delay.

d. Necessity for Further Investigations. Accomplishment of the remedial measures outlined in Paragraph 7.2, will not require further investigations by the Owner.

7.2 Recommendations and Remedial Measures.

a. The following studies and remedial measures are recommended to be undertaken by the Owner, in approximate order of priority, without delay:

(1) As is presently being attempted, establish an adequate grass cover on the embankment.

(2) Visually monitor the seepage near the right abutment and at the spillway wingwall on a daily basis. If either significant changes in seepage or turbidity are noted, have the condition evaluated immediately by a professional engineer experienced in the design and construction of dams.

(3) Fill in the low areas at the top of the dam so that the embankment is at or above its design elevation.

(4) Since the outlet works conduit has not been inspected since its construction, have the conduit inspected. Particular attention should be paid to the joints to determine if there is an increase in joint openings.

b. In addition, the Owner should institute the following operational and maintenance procedures:

(1) Develop a detailed emergency operation and warning system.

(2) During periods of unusually heavy rains, provide round-the-clock surveillance of the dam.

(3) When warnings of a storm of major proportions are given by the National Weather Service, the Owner should activate his emergency operation and warning system.

(4) As presently required by the Commonwealth, initiate a program of formal annual inspections by a professional engineer experienced in the design and construction of dams. Utilize the inspection results to determine if remedial measures are necessary.

APPENDIX A

CHECKLIST - ENGINEERING DATA

CHECKLIST

ENGINEERING DATA

DESIGN, CONSTRUCTION, AND OPERATION
PHASE I

NAME OF DAM: HAWK MOUNTAIN

NDI ID NO.: PA-01129 DER ID NO.: 54-180

Sheet 1 of 4

ITEM	REMARKS
AS-BUILT DRAWINGS	See PLATES E-2 TO E-5
REGIONAL VICINITY MAP	See PLATE E-1
CONSTRUCTION HISTORY	BUILT 1977 - 1978
TYPICAL SECTIONS OF DAM	See PLATE E-3
OUTLETS: Plan Details Constraints Discharge Ratings	NO RATINGS IN design DATA. REQUIRED MINIMUM RELEASE 0.21 CFS FOR PLANS AND DETAILS, see PLATES.

D-1

ENGINEERING DATA

ITEM	REMARKS
RAINFALL/RESERVOIR RECORDS	DAILY POOL RECORDS MAINTAINED by OWNER.
DESIGN REPORTS	NONE AS SUCH IN FILES. HOWEVER, VARIOUS design DATA IS IN FILES.
GEOLOGY REPORTS	NONE - AVAILABLE DATA IS ON PLATE E-2.
DESIGN COMPUTATIONS: Hydrology and Hydraulics (H&H) Dam Stability Seepage Studies	H&H + SEEPAGE - NONE SUMMARY OF STABILITY ATTACHED AT END OF FORMS. COMMONWEALTH ANALYSIS OF H&H IS AVAILABLE.
MATERIALS INVESTIGATIONS: Boring Records Laboratory Field	ONLY AVAILABLE DATA IS SHOWN ON PLATE E-2
POSTCONSTRUCTION SURVEYS OF DAM	NONE

ENGINEERING DATA

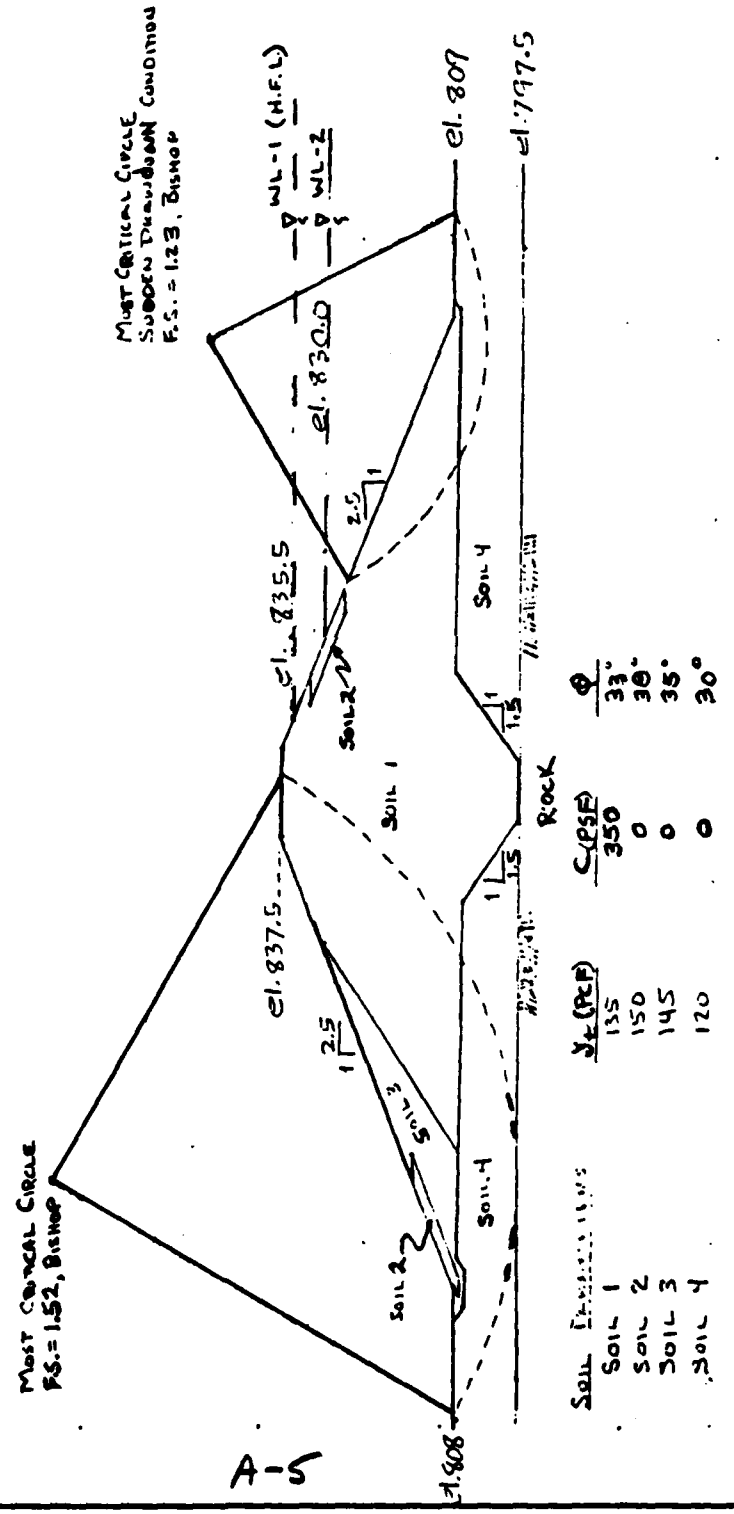
ITEM	REMARKS
BORROW SOURCES	Spillway Approach Channel
MONITORING SYSTEMS	None
MODIFICATIONS	None
HIGH POOL RECORDS	No significant floods since construction.
POSTCONSTRUCTION ENGINEERING STUDIES AND REPORTS	No written studies.
PRIOR ACCIDENTS OR FAILURE OF DAM: Description Reports	None

ENGINEERING DATA

ITEM	REMARKS
MAINTENANCE AND OPERATION RECORDS	No formal records
SPILLWAY: Plan Sections Details	See Plate E-5
OPERATING EQUIPMENT: Plans Details	See Plate E-4
PREVIOUS INSPECTIONS Dates Deficiencies	None

GILBERT ASSOCIATES, INC. ENGINEERS AND CONSULTANTS READING, PA.	CLIENT HAWK MOUNTAIN COUNCIL, BSA	FILING CODE 06-7190-00C
	PROJECT CAMP NISATIN LAKE DEVELOPMENT	W.O. 67190 PAGE 1 OF 1
SYSTEM EARTH EMBANKMENT		ORIGINATOR K H HESTON DATE 4/13/77
CALCULATION FOR SLOPE STABILITY OF EARTH EMBANKMENT USING "SLOPE"		REVIEWER [illegible] DATE 5/12/77
		RESULTS

TYPICAL SECTION



Soil Description	γ_t (PCF)	C (PSF)	ϕ
Soil 1	135	350	33°
Soil 2	150	0	38°
Soil 3	145	0	35°
Soil 4	120	0	30°

RESULTS OF THE ANALYSIS USING THE COMPUTER PROGRAM "SLOPE" (ICES)
(output dated 4-15-77)

APPENDIX B

CHECKLIST - VISUAL INSPECTION

CHECKLIST

VISUAL INSPECTION

PHASE I

Name of Dam: HAWK MOUNTAIN County: SCHUYLKILL State: PENNSYLVANIA

NDI ID No.: PA-01129 DER ID No.: 54-180

Type of Dam: EARTHFILL W/TOE DRAIN Hazard Category: HIGH

Date(s) Inspection: 2 JUNE 1980 Weather: CLEAR Temperature: 70's °F

SOIL CONDITIONS: VERY MOIST

Pool Elevation at Time of Inspection: 830.1 msl/Tailwater at Time of Inspection: _____ msl

Inspection Personnel:

F. COX (HMC-BSA) D. WILSON (GFCC)

J. KNIGHT (HMC-BSA) D. EBERSOLE (GFCC)

MR. WILLCYTE (HMC-BSA)

A. WHITMAN (GFCC) Recorder

B-1

EMBANKMENT

Sheet 1 of 2

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	NONE	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	NONE	
SLOUGHING OR EROSION: **Embankment Slopes** **Abutment Slopes**	MINOR EROSION OF BARE SOIL ON TOP DOWN THE SLOPE	A FEW MINOR SWALES HAVE BEEN ERODED IN DRAIN MATERIAL ON DOWNSTREAM SLOPE.
CREST ALIGNMENT: **Vertical** **Horizontal**	HORIZONTAL - OK VERTICAL - SEE SURVEY DATA FOLLOWING INSPECTION FORMS.	
RIPRAP FAILURES	NONE - good CONDITION	

EMBANKMENT

Sheet 2 of 2

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT WITH: **Abutment** **Spillway** **Other Features**	POROUS CONCRETE PIPE THAT EXTENDS ALONG TOE @ RT ABUTMENT – 0.25 gpm CLEAR SEEPAGE.	
ANY NOTICEABLE SEEPAGE	SPRING AT RIGHT ABUTMENT – 10gpm CLEAR FLOW	
STAFF GAGE AND RECORDER	STAFF GAGE – OK NO RECORDER	STAFF GAGE AT WEIR CREST. BECAUSE OF ITS LOCATION, IT MAY NOT ACCURATELY REFLECT POOL ELEVATION.
DRAINS	No deficiencies	
VEGETATION	VIRTUALLY NO GRASS GROWING ON EMBANKMENT SOIL IS BARE	

OUTLET WORKS

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	16" RCP TOO SMALL TO ENTER.	
INTAKE STRUCTURE	Submerged	
OUTLET STRUCTURE	FREE OUTFALL AT STILLING BASIN	
OUTLET CHANNEL	See Spillway	
EMERGENCY GATE	Operated easily by 1 man. Operating mechanism in good condition.	opened about 5%

UNGATED SPILLWAY

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	GOOD CONDITION	
APPROACH CHANNEL	SUBMERGED EXCAVATED CHANNEL	
DISCHARGE CHANNEL	PROTECTED BY HEAVY RIPRAP.	LEFT WINGWALL HAS SIGNIFICANT FLOW FROM 1 WEEPHOLE. (2gpm±)
BRIDGE AND PIERS	STEEL TRUSS BRIDGE, NO PIERS. BRIDGE IN GOOD CONDITION.	

INSTRUMENTATION

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS		
OBSERVATION WELLS		
WEIRS	ONLY STAFF GAGE AT SITE	
PIEZOMETERS		
OTHER		

DOWNSTREAM CHANNEL

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION: Obstructions Debris Other	CLEAR AT DAMSITE	
SLOPES	STEEP AT DAMSITE.	
APPROXIMATE NUMBER OF HOMES AND POPULATION	1 DWELLING AND 1 TRAILER	SEE EXHIBIT D-1

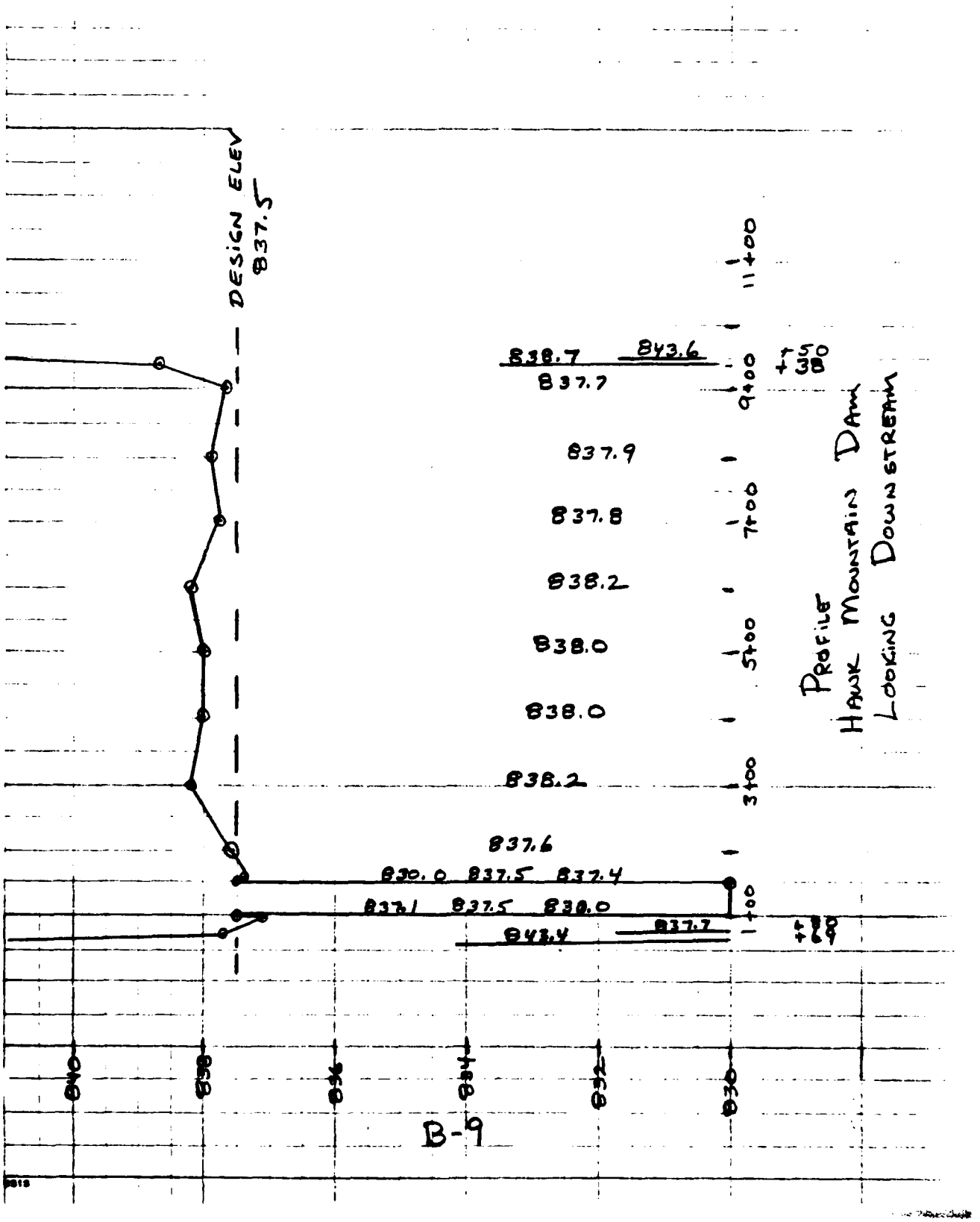
RESERVOIR AND WATERSHED

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	MILD EXCEPT AT SPILLWAY APPROACH CHANNEL, WHERE STEEP	
SEDIMENTATION	NO REPORTED PROBLEMS	
WATERSHED DESCRIPTION	BOY SCOUT CAMP IS ONLY DEVELOPMENT WITHIN. MOSTLY STEEP, WOODED SLOPES.	UPSTREAM IMPOUNDMENT VERY SMALL.

GANNETT FLEMING CORDDRY AND CARPENTER, INC.
HARRISBURG, PA.

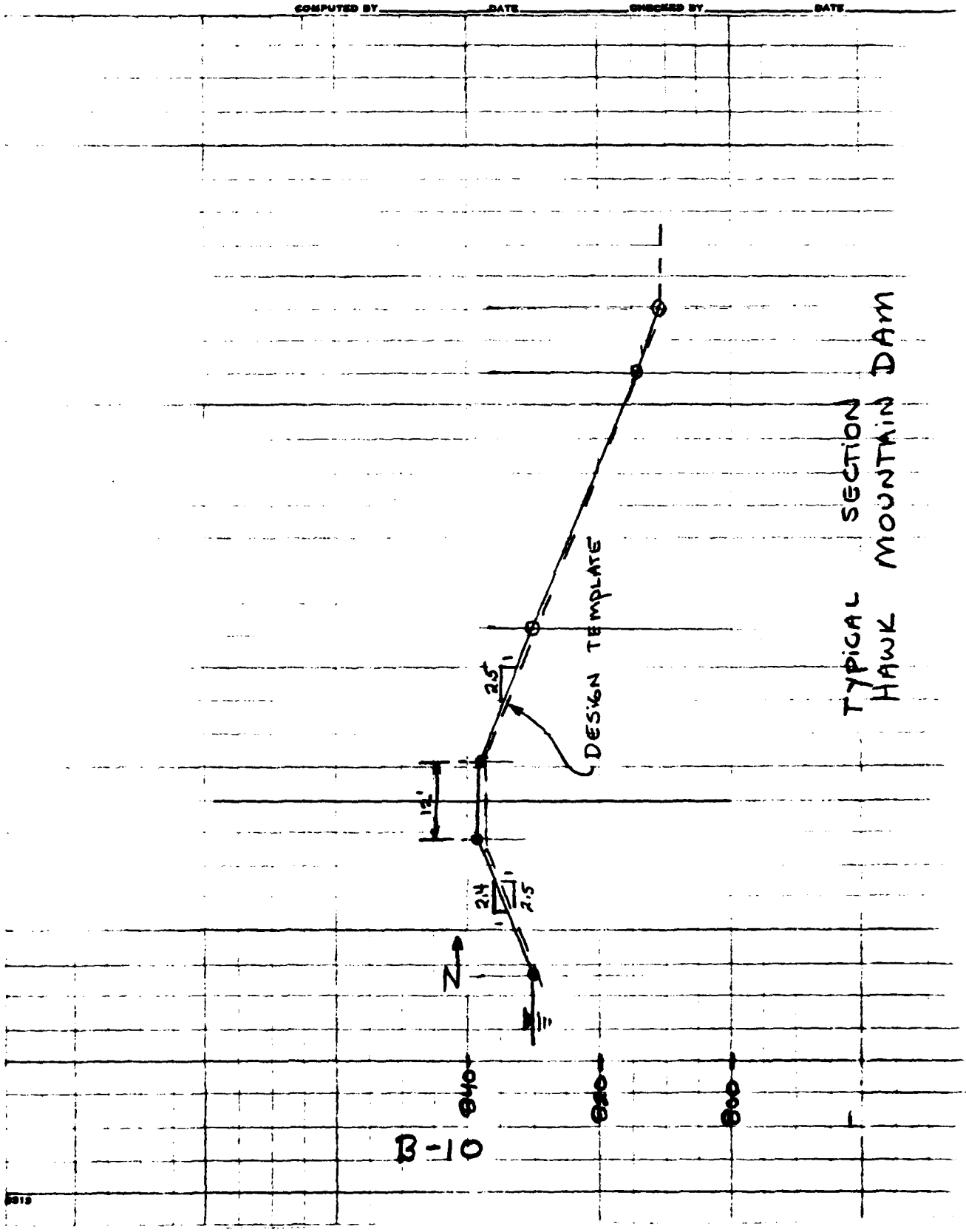
SUBJECT _____ FILE NO. _____
SHEET NO. ____ OF ____ SHEETS
FOR _____
COMPUTED BY _____ DATE _____ CHECKED BY _____ DATE _____



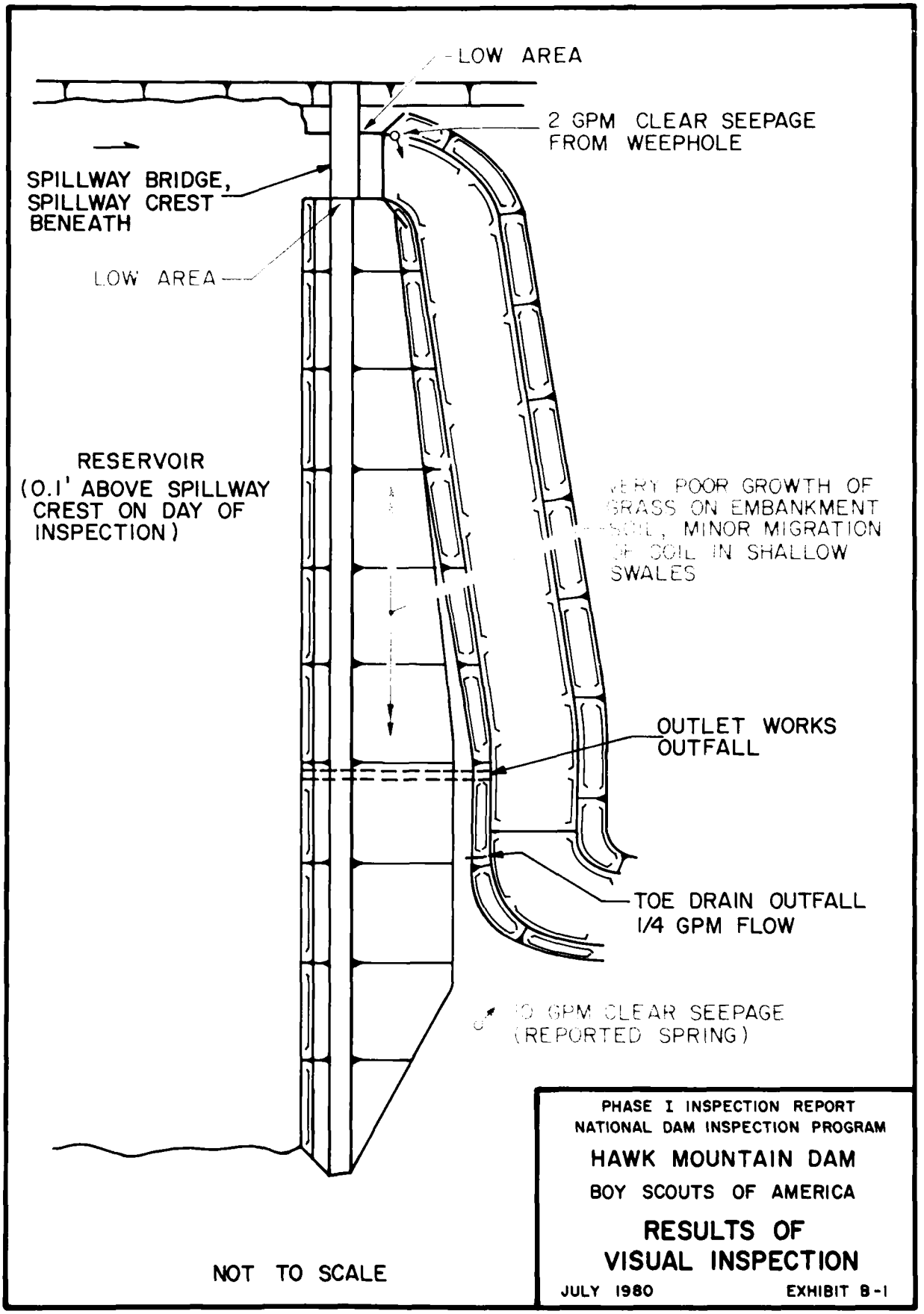
B-9

GANNETT FLEMING CORDDRY AND CARPENTER, INC.
HARRISBURG, PA.

SUBJECT _____ FILE NO. _____
SHEET NO. _____ OF _____ SHEE
FOR _____
COMPUTED BY _____ DATE _____ CHECKED BY _____ DATE _____



B-10



PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

HAWK MOUNTAIN DAM

BOY SCOUTS OF AMERICA

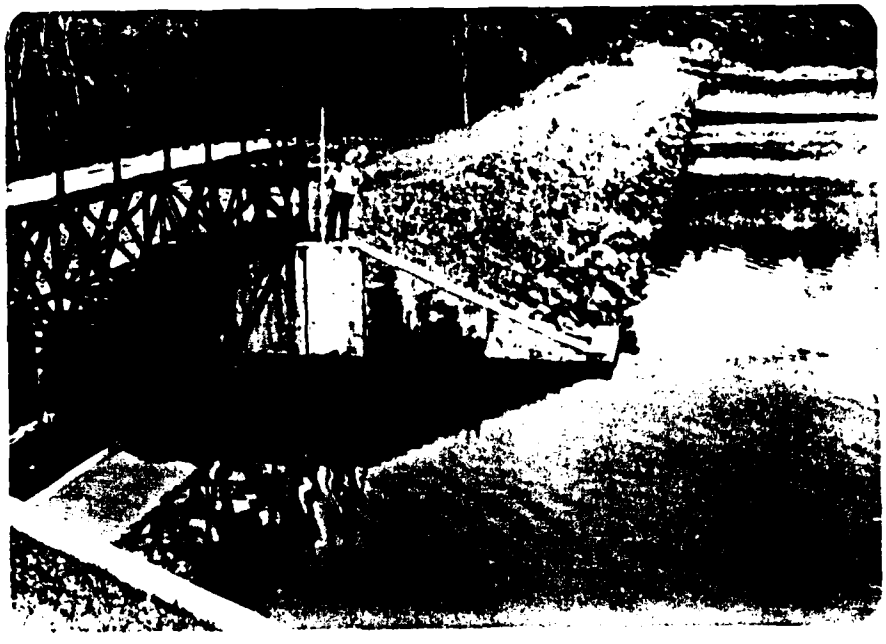
RESULTS OF VISUAL INSPECTION

JULY 1980 EXHIBIT B-1

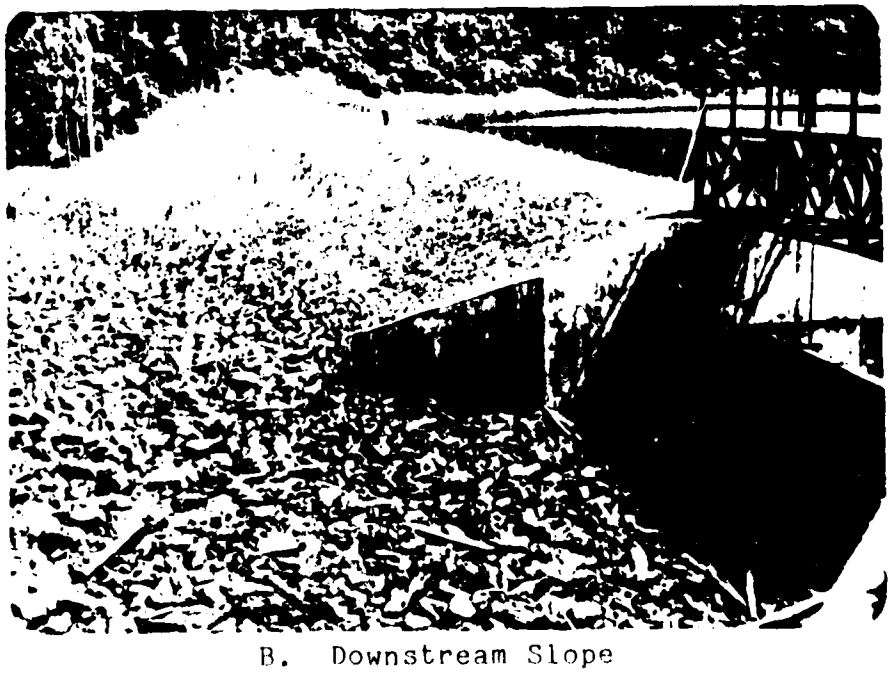
APPENDIX C

PHOTOGRAPHS

HAWK MOUNTAIN DAM

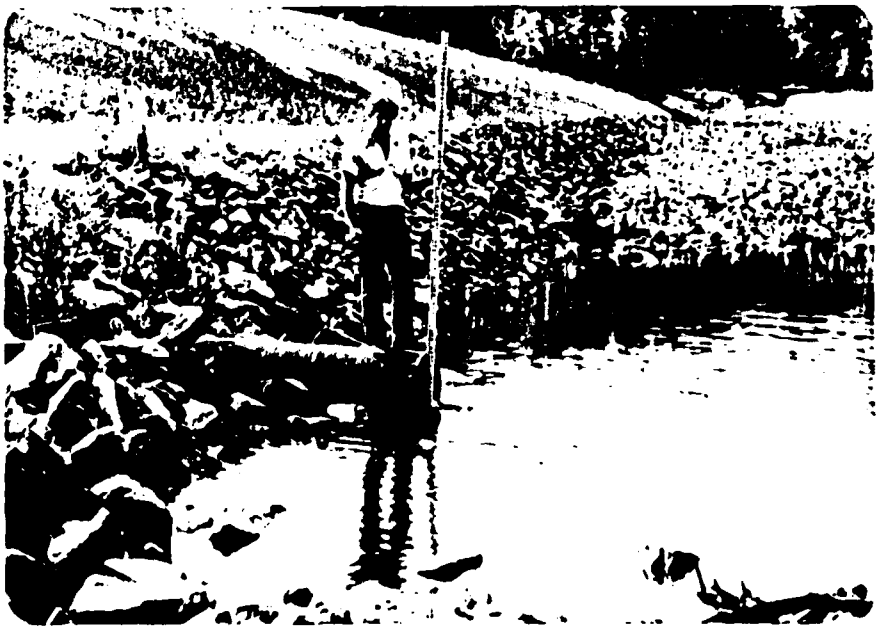


A. Upstream Slope

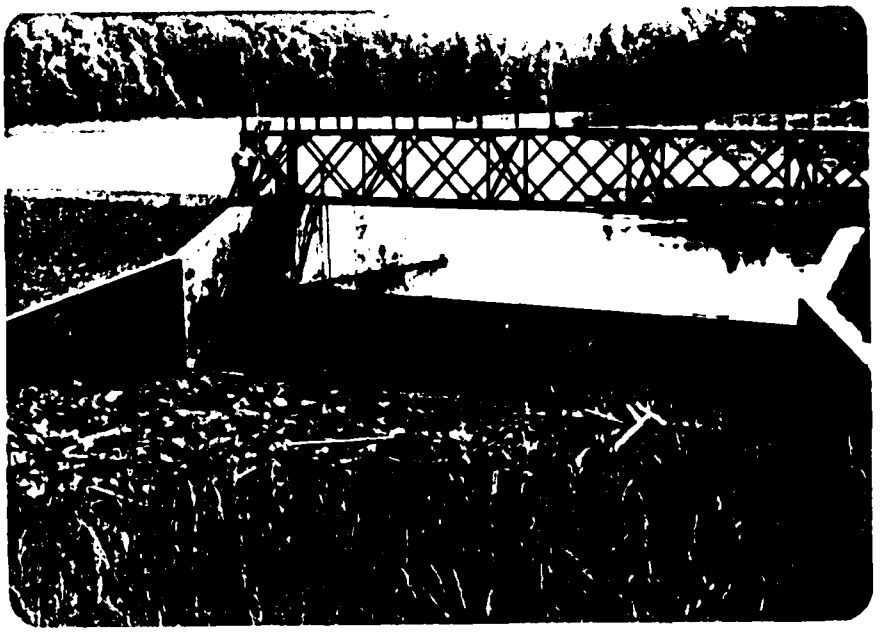


B. Downstream Slope

C. Outlet Works Operating Mechanism

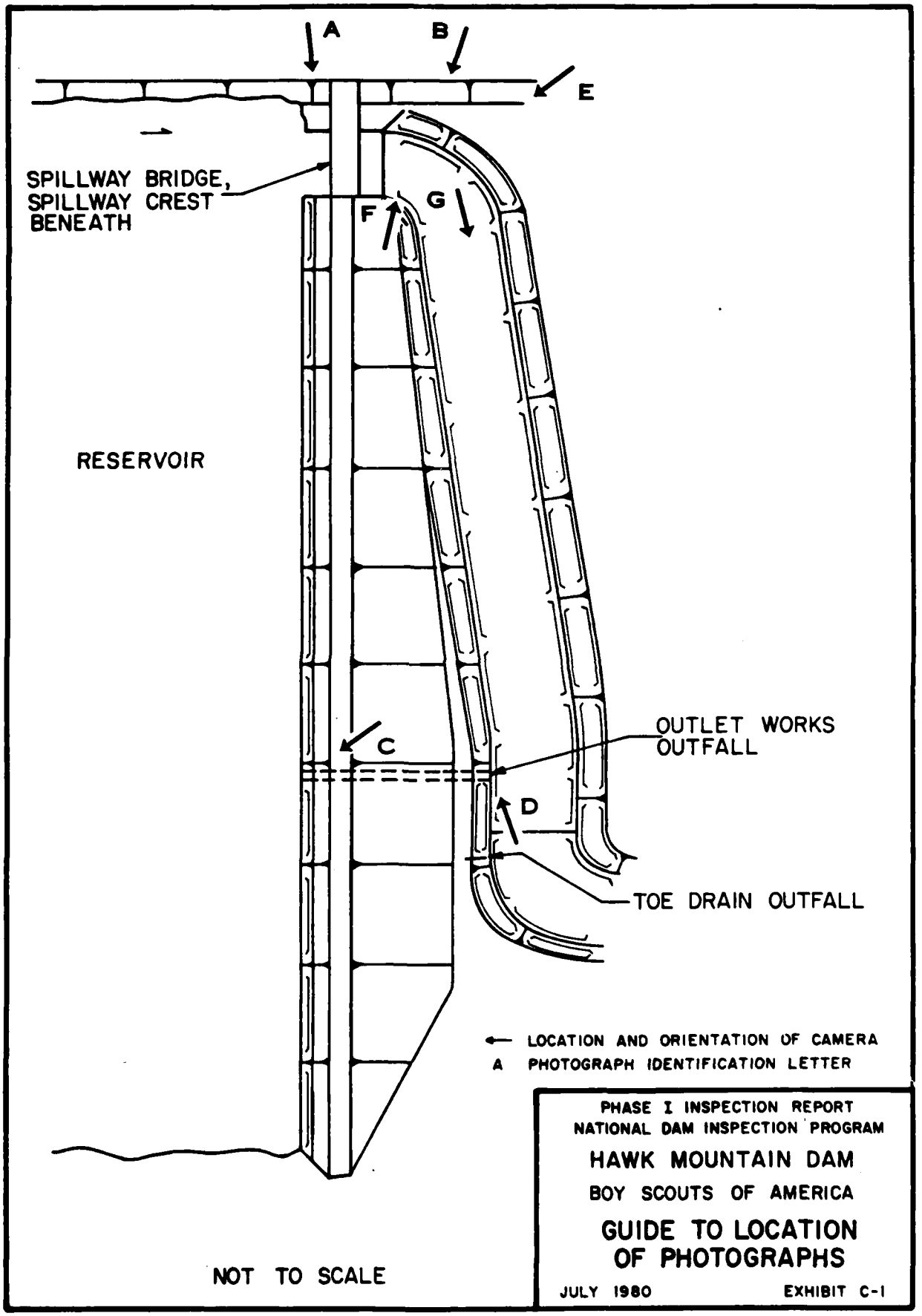


D. Outlet Works Outfall



E. Spillway

F. Spillway Left Wingwall



PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

HAWK MOUNTAIN DAM

BOY SCOUTS OF AMERICA

GUIDE TO LOCATION OF PHOTOGRAPHS

JULY 1980 EXHIBIT C-1

APPENDIX D

HYDROLOGY AND HYDRAULICS

APPENDIX D

HYDROLOGY AND HYDRAULICS

Spillway Capacity Rating:

In the recommended Guidelines for Safety Inspection of Dams, the Department of the Army, Office of the Chief of Engineers (OCE), established criteria for rating the capacity of spillways. The recommended Spillway Design Flood (SDF) for the size (small, intermediate, or large) and hazard potential (low, significant, or high) classification of a dam is selected in accordance with the criteria. The SDF for those dams in the high hazard category varies between one-half of the Probable Maximum Flood (PMF) and the PMF. If the dam and spillway are not capable of passing the SDF without overtopping failure, the spillway capacity is rated as inadequate. If the dam and spillway are capable of passing one-half of the PMF without overtopping failure, or if the dam is not in the high hazard category, the spillway capacity is not rated as seriously inadequate. A spillway capacity is rated as seriously inadequate if all of the following conditions exist:

(a) There is a high hazard to loss of life from large flows downstream of the dam.

(b) Dam failure resulting from overtopping would significantly increase the hazard to loss of life downstream from the dam from that which would exist just before overtopping failure.

(c) The dam and spillway are not capable of passing one-half of the PMF without overtopping failure.

Description of Model:

If the Owner has not developed a PMF for the dam, the watershed is modeled with the HEC-1DB computer program, which was developed by the U.S. Army Corps of Engineers. The HEC-1DB computer program calculates a PMF runoff hydrograph (and percentages thereof) and routes the flows through both reservoirs and stream sections. In addition, it has the capability to simulate an overtopping dam failure. By modifying the rainfall criteria, it is also possible to model the 100-year flood with the program.

APPENDIX D

SUSQUEHANNA River Basin
Name of Stream: LOWER LITTLE SWATARA CREEK
Name of Dam: HAWK MOUNTAIN
NDI ID No.: PA-01129
DER ID No.: 54-180
Latitude: N 40° 32' 35" Longitude: W 76° 14' 10"
Top of Dam Elevation: 837.1 (EXISTING)
Streambed Elevation: 802.5 Height of Dam: 35 ft
Reservoir Storage at Top of Dam Elevation: 141 acre-ft
Size Category: SMALL
Hazard Category: HIGH (see Section 5)
Spillway Design Flood: VARIES ½ PMF TO PMF
SELECT ½ PMF
(2 DWELLINGS DOWNSTREAM)

UPSTREAM DAMS

Name	Distance from Dam (miles)	Height (ft)	Storage at top of Dam Elevation (acre-ft)	Remarks
UNNAMED	0.4	13±	★	DER ID 54-116 IGNORED IN ANALYSIS, PART OF BOY SCOUT CAMP

DOWNSTREAM DAMS

NONE				

★ DESCRIBED AS "KNEE DEEP" FOR NORMAL POOL; VISUAL ESTIMATE: 2 ACRE-FT.

SUSQUEHANNA River Basin

Name of Stream: LOWER LITTLE SWATARA CREEK

Name of Dam: HAWK MOUNTAIN

DETERMINATION OF PMF RAINFALL & UNIT HYDROGRAPH

UNIT HYDROGRAPH DATA:

Sub-area	Drainage Area (square miles)	Cp (1)	Ct (2)	L miles (3)	L_{ca} miles (4)	L' miles (5)	Tp hours (6)	Map Area (7)	Plate (8)
A-1	1.34	0.85	2.20	2.61	1.55	N/A	3.35	15B	N/A
Total	1.34								

(See Sketch on Sheet D-4)

(1) & (2): Snyder Unit Hydrograph coefficients supplied by Baltimore District, Corps of Engineers on maps and plates referenced in (7) & (8)

The following are measured from the outlet of the subarea:

(3): Length of main watercourse extended to divide

(4): Length of main watercourse to the centroid

The following is measured from the upstream end of the reservoir at normal pool:

(5): Length of main watercourse extended to divide

(6): $Tp=C_t \times (L \times L_{ca})^{0.3}$, except where the centroid of the subarea is located in the reservoir. Then $Tp=C_t \times (L')^{0.6}$

Initial flow is assumed at 1.5 cfs/sq. mile

Computer Data: QRCSN = -0.05 (5% of peak flow)
RTIOR = 2.0

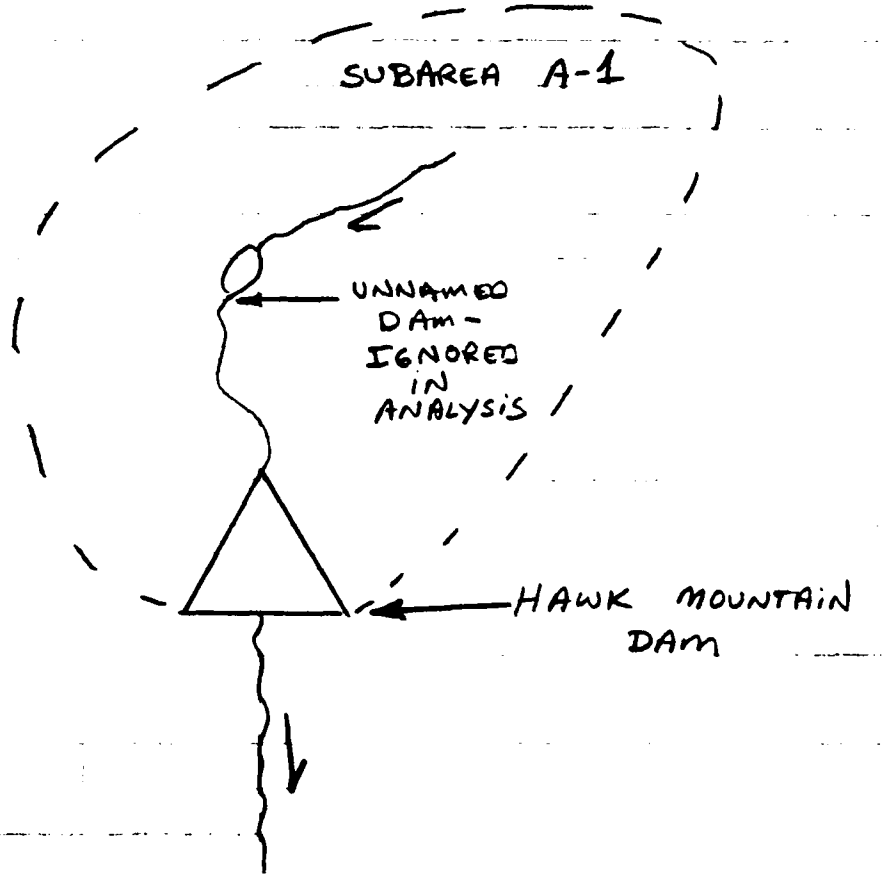
RAINFALL DATA:

PMF Rainfall Index= 22.15 in., 24 hr., 200 sq. mile

	Hydromet. 40 (Susquehanna Basin)	Hydromet. 33 (Other Basins)
Zone:	N/A	N/A
Geographic Adjustment Factor:	102%	1.0
Revised Index Rainfall:	22.6	N/A

RAINFALL DISTRIBUTION (percent)

Time	Percent
6 hours	118
12 hours	127
24 hours	136
48 hours	142
72 hours	145
96 hours	N/A



SKETCH OF SYSTEM

Data for Dam at Outlet of Subarea A-1 (See sketch on Sheet D-4)

Name of Dam: HAWK MOUNTAIN

STORAGE DATA: DATA TAKEN FROM CONTOURS ON DESIGN DRAWING EXCEPT EL 840.0

Elevation		Area (acres)	Storage million gals	Storage acre-ft		Remarks
809.3	=ELEVO*	0	0	0		
810.0	=ELEV1	.04 =A1		.01	=S1	
815.0		.50		1.1		
820.0		2.68		8.4		
825.0		4.77		26.8		
830.0		9.05		60.7		NORMAL POOL
835.0		12.31		113.9		
837.5		13.95		146.7		TOP OF DAM
840.0		17.6				USGS MAPPING

~~* ELEVO = ELEV1 - (3S1/A1)~~

** Planimetered contour at least 10 feet above top of dam

Reservoir Area at Normal Pool is 1 percent of subarea watershed.

BREACH DATA: NOT USED

See Appendix B for sections and existing profile of the dam.

Soil Type from Visual Inspection: _____

Maximum Permissible Velocity (Plate 28, EM 1110-2-1601) _____ fps
(from $Q = CLH^{3/2} = V \cdot A$ and depth = (2/3) x H) & A = L·depth

HMAX = $(4/9\ V^2/C^2)$ = _____ ft., C = ____ Top of Dam El.= ____

HMAX + Top of Dam El. = _____ = FAILEL
(Above is elevation at which failure would start)

Dam Breach Data:

BRWID = _____ ft (width of bottom of breach)
Z = _____ (side slopes of breach)
ELBM = _____ (bottom of breach elevation, minimum of zero storage elevation)
WSEL = _____ (normal pool elevation)
T FAIL= _____ mins = _____ hrs (time for breach to develop)

Data for Dam at Outlet of Subarea A-1

Name of Dam: HAWK MOUNTAIN

SPILLWAY DATA:	Existing Conditions	Design Conditions
Top of Dam Elevation	837.1	837.5
Spillway Crest Elevation	830.0	830.0
Spillway Head Available (ft)	7.1	7.5
Type Spillway	TRAPEZOIDAL SHAPED WEIR	
"C" Value - Spillway	3.8 †	3.8
Crest Length - Spillway (ft)	50.0	50.0
Spillway Peak Discharge (cfs)	3594.5	3902.5
Auxiliary Spillway Crest Elev.	N/A	N/A
Auxiliary Spill. Head Avail. (ft)	N/A	N/A
Type Auxiliary Spillway	N/A	N/A
"C" Value - Auxiliary Spill. (ft)	N/A	N/A
Crest Length - Auxil. Spill. (ft)	N/A	N/A
Auxiliary Spillway Peak Discharge (cfs)	N/A	N/A
Combined Spillway Discharge (cfs)	≈ 3600	≈ 3900

† KING, HANDBOOK OF HYDRAULICS, 5-15, TABLE 53

Spillway Rating Curve: $Q = CLH^{3/2}$

Elevation	Q Spillway (cfs)	Q Auxiliary Spillway (cfs)	Combined (cfs)

OUTLET WORKS RATING:	Outlet 1	Outlet 2	Outlet 3
Invert of Outlet	803.4		
Invert of Inlet	808.0		
Type	RCP		
Diameter (ft) = D	1.25		
Length (ft) = L	177.5		
Area (sq. ft) = A	1.23		
N	.013		
K Entrance	0.5		
K Exit	1.0		
K Friction=$29.1 N^2 L/R^{4/3}$	4.17		
Sum of K	5.62		
$(1/K)^{0.5} = C$	0.42		
Maximum Head (ft) = HM	33±		
$Q = CA\sqrt{2g(HM)}$ (cfs)	23.8		
Q Combined (cfs)	≈ 24		

GANNETT FLEMING CORDDRY
AND CARPENTER, INC.
HARRISBURG, PA.

SUBJECT _____ FILE NO. _____

_____ SHEET NO. ____ OF ____ SHEETS

FOR _____

COMPUTED BY _____ DATE _____ CHECKED BY _____ DATE _____

Selected Computer Output

```
**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  01 APR 80
**********
    1                 A1                    NATIONAL DAM INSPECTION PROGRAM
    2                 A2                      LOWER LITTLE SWATARA CREEK
    3                 A3                          HAWK MOUNTAIN DAM
    4                 P     300        0       15        0        0        0        0        0       -4        0
    5                 B1      5
    6                 J       1        7        1
    7                 J1      1       .9       .9       .7       .6       .5       .4
    8                 K       0        1                                          1
    9                 K1          RUNOFF INTO HAWK MOUNTAIN
   10                 M       1        1    1.34                1.34                                    1
   11                 P                22.6      118      127      136      142      145
   12                 T                                                          1      .05                .01
   13                 W    3.35     0.85
   14                 X    -1.5    -0.05      2.0
   15                 K       1        1                                          1
   16                 K1          ROUTE THROUGH HAWK MOUNTAIN DAM
   17                 Y                                    1
   18                 Y1      1                                                -830
   19                 SA      0      .04       .5     2.68     4.77     9.05    12.31    13.95     17.6
   20                 SF  809.3      810      815      820      825      830      835    837.5      940
   21                 SS    830       50      3.8      1.5
   22                 SD  837.1
   23                 SL      1       15       70      370      400      815      830
   24                 SV  837.1    837.4    837.7    837.9      838    838.5      840
   25                 K      99
```

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS						
				RATIO 1 1.00	RATIO 2 .90	RATIO 3 .80	RATIO 4 .70	RATIO 5 .60	RATIO 6 .50	RATIO 7 .40
HYDROGRAPH AT	1	1.34	1	3462.	3116.	2769.	2423.	2077.	1731.	1385.
	(	3.47)	(	98.02)(	88.22)(	78.42)(	68.62)(	58.81)(	49.01)(	39.21)(
ROUTED TO	1	1.34	1	3443.	3098.	2753.	2408.	2064.	1719.	1375.
	(	3.47)	(	97.48)(	87.72)(	77.95)(	68.18)(	58.44)(	48.69)(	38.94)(

SUMMARY OF DAM SAFETY ANALYSIS

HAWK MOUNTAIN DAM

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	830.00	830.00	837.10
STORAGE	61.	61.	161.
OUTFLOW	0.	0.	3595.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	836.90	0.00	138.	3663.	0.00	42.75	0.00
.90	836.63	0.00	132.	3098.	0.00	42.75	0.00
.80	835.94	0.00	126.	2753.	0.00	42.75	0.00
.70	835.44	0.00	119.	2408.	0.00	43.00	0.00
.60	834.90	0.00	113.	2064.	0.00	43.00	0.00
.50	834.34	0.00	106.	1719.	0.00	43.00	0.00
.40	833.74	0.00	99.	1375.	0.00	43.00	0.00

GANNETT FLEMING CORDDRY AND CARPENTER, INC.
HARRISBURG, PA.

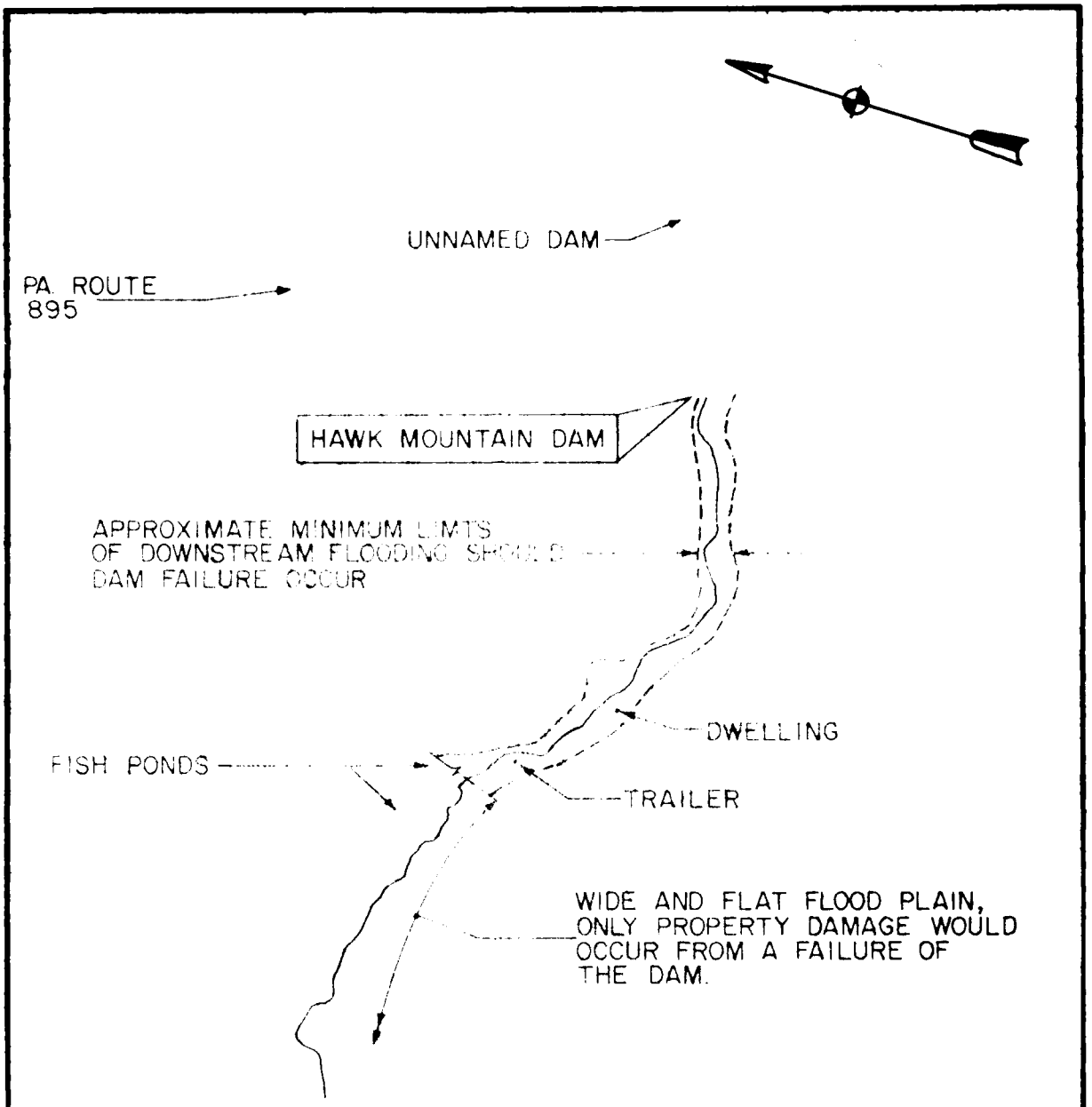
SUBJECT _____ FILE NO. _____
SHEET NO. ____ OF ____ SHEETS
FOR _____
COMPUTED BY _____ DATE _____ CHECKED BY _____ DATE _____

Summary of Pertinent Results

PMF RAINFALL = 26.22"

(EXISTING CONDITIONS)

	PMF	½ PMF=SDF
Runoff (inches)	23.61	11.81
Peak Inflow (cfs)	8,462	1,731
Peak Outflow (cfs)	3,443	1,719
Freeboard (ft.)	0.2	2.76



NOTES:

1. **LIMITS OF DOWNSTREAM FLOODING ARE ESTIMATES BASED ON VISUAL OBSERVATIONS.**
2. **CIRCLED NUMBERS INDICATE STATIONS USED IN COMPUTER ANALYSIS.**
3. THIS MAP SHOULD NOT BE USED IN CONNECTION WITH THE EMERGENCY OPERATION AND WARNING PLAN.

2000 0 2000

SCALE: 1 IN. = 2000 FT.

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

HAWK MOUNTAIN DAM

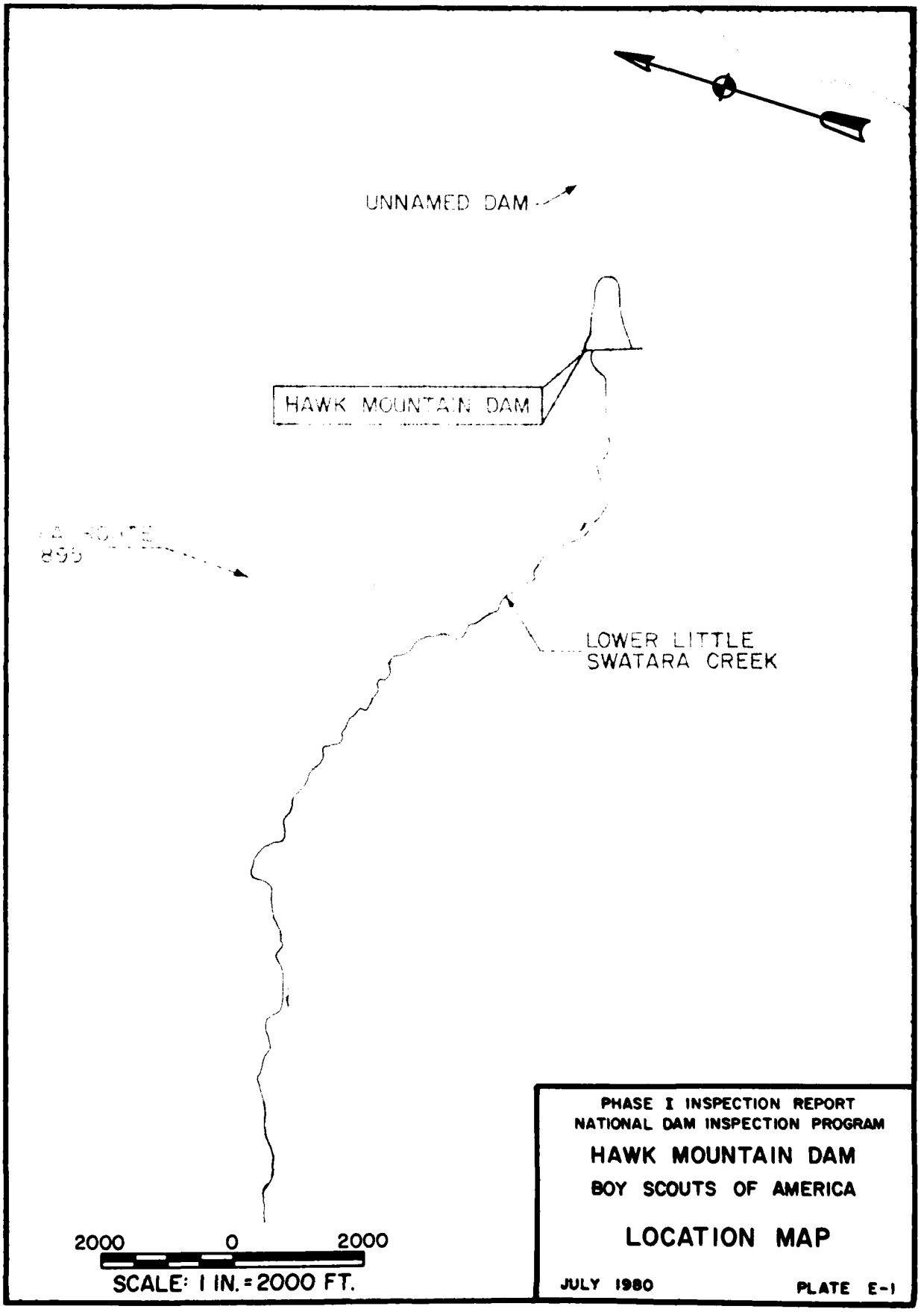
BOY SCOUTS OF AMERICA

DOWNSTREAM DEVELOPMENT PLAN

JULY 1980 EXHIBIT D-1

APPENDIX E

PLATES



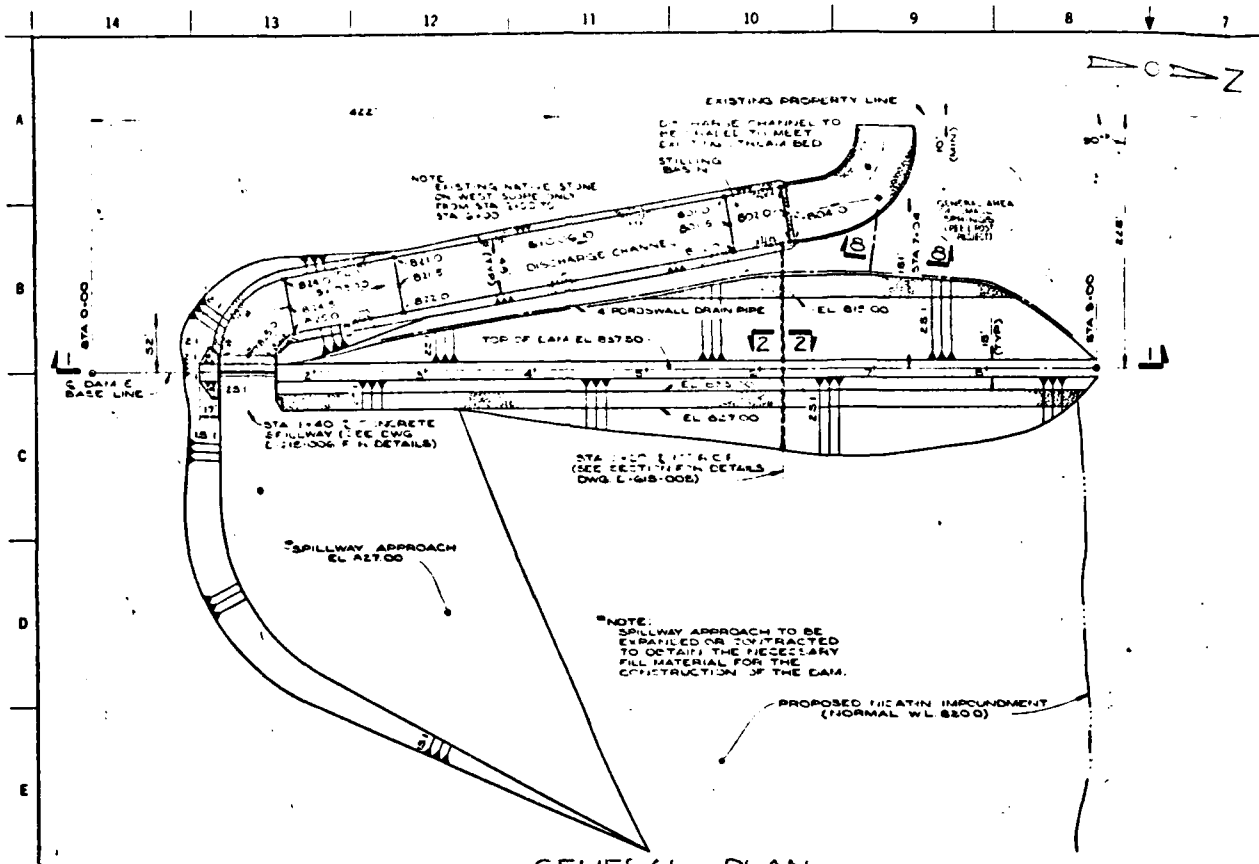
PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

HAWK MOUNTAIN DAM

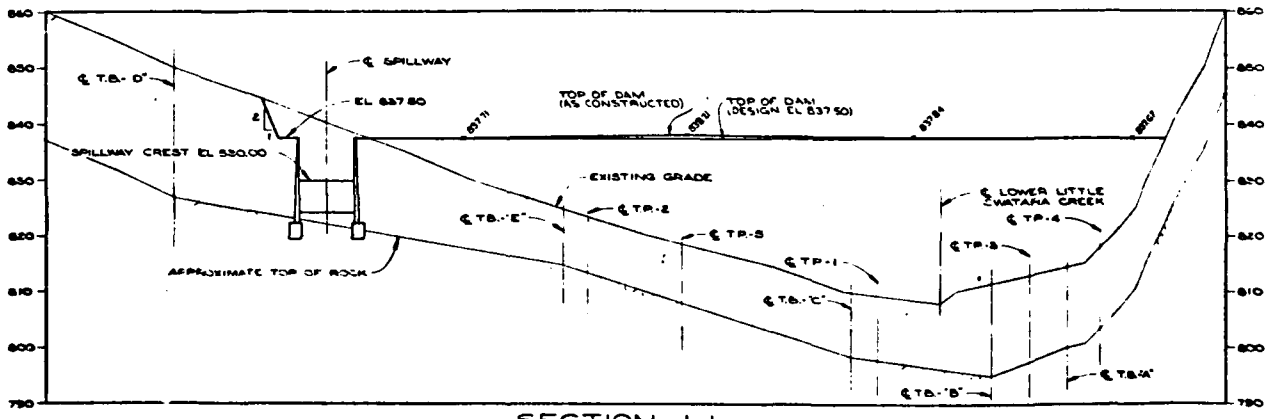
BOY SCOUTS OF AMERICA

LOCATION MAP

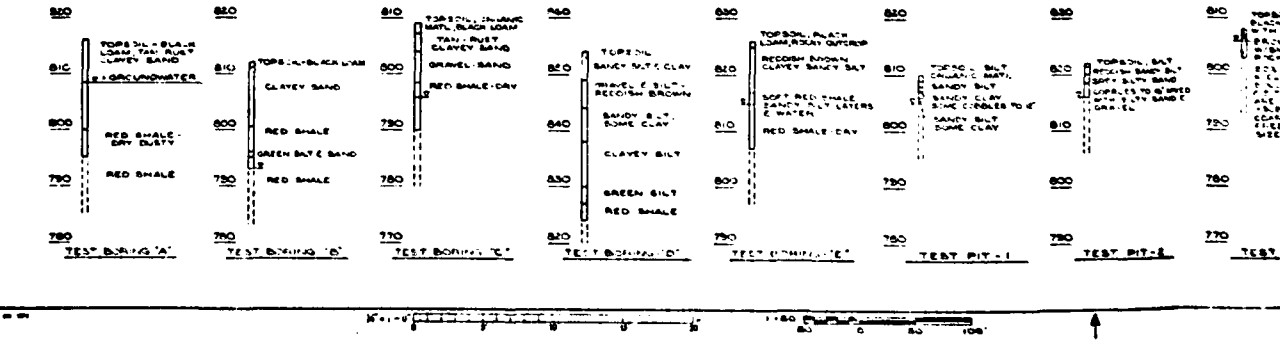
JULY 1980 PLATE E-1

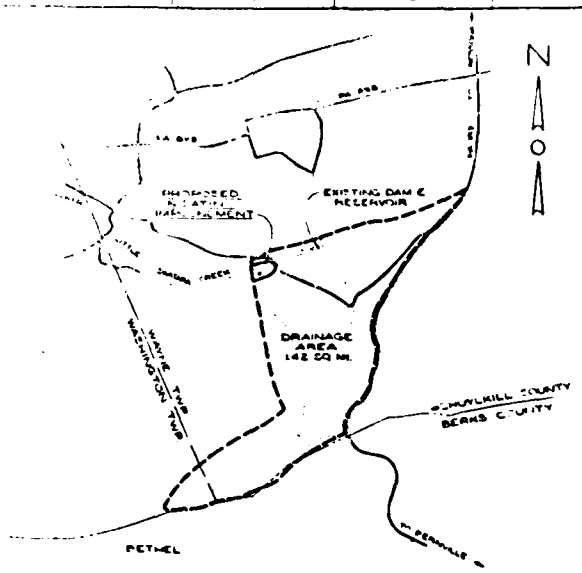


GENERAL PLAN

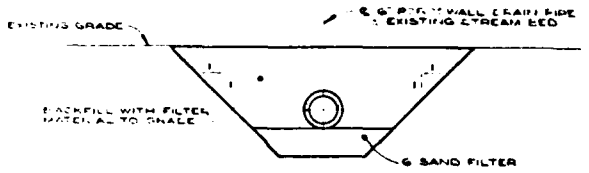


SECTION 1-1





LOCATION PLAN
SCALE: 1" = 2000'



SECTION B-B
NO SCALE

PHASE I INSPECTION REPORT
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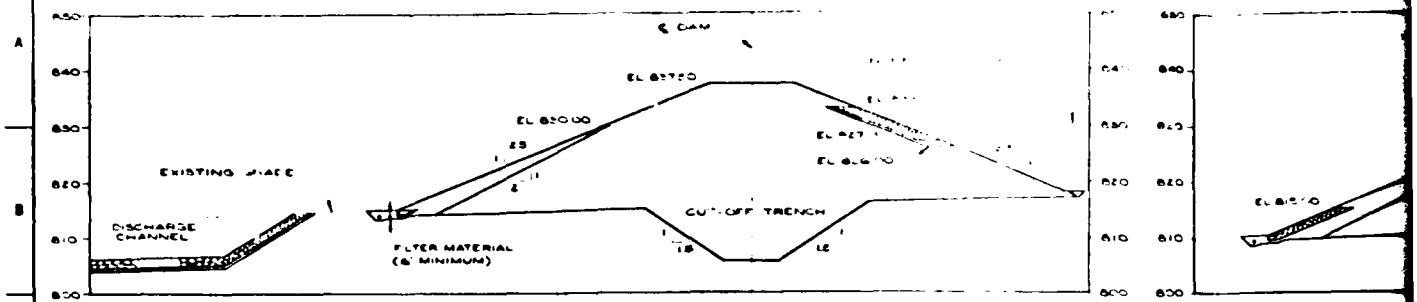
HAWK MOUNTAIN DAM
BOY SCOUTS OF AMERICA

PLAN AND PROFILE

JULY 1980 PLATE E-2



STATION 5-00
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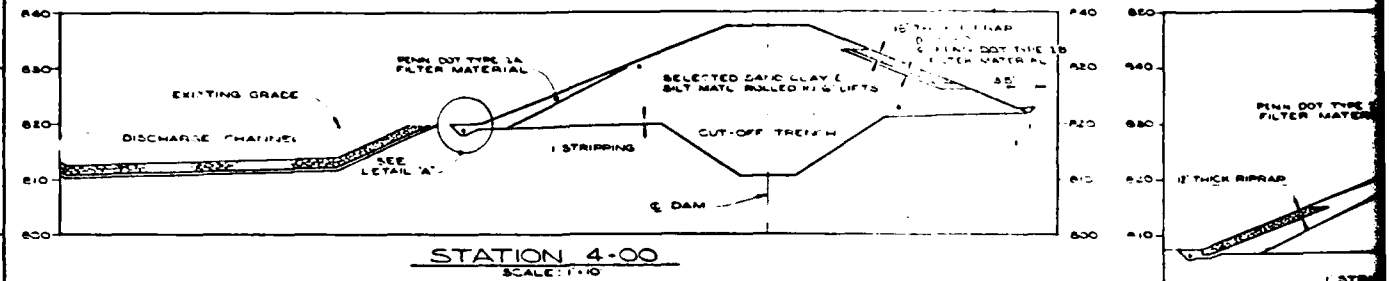

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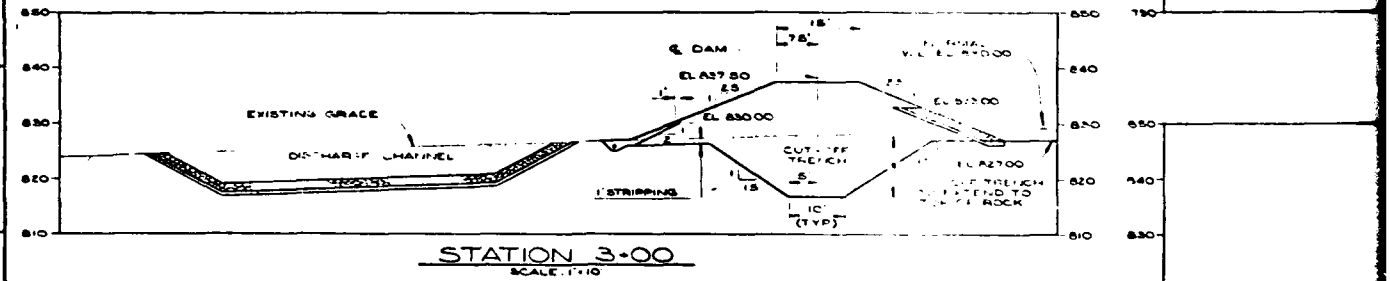

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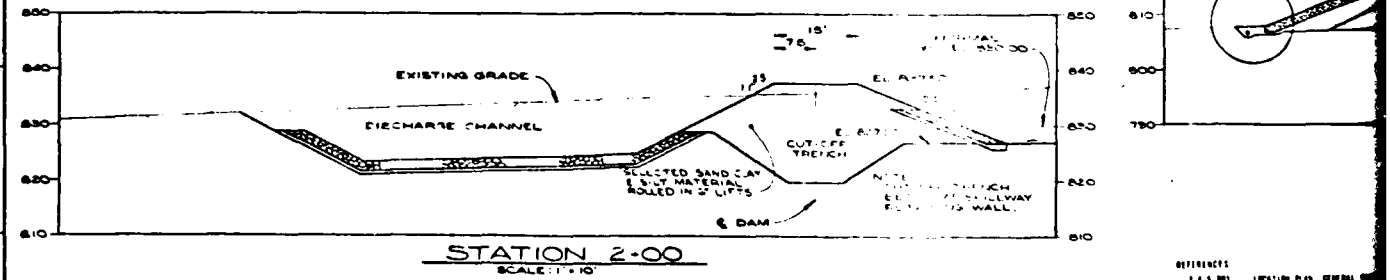

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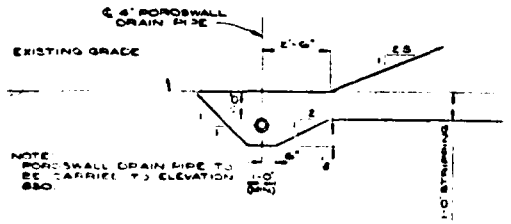
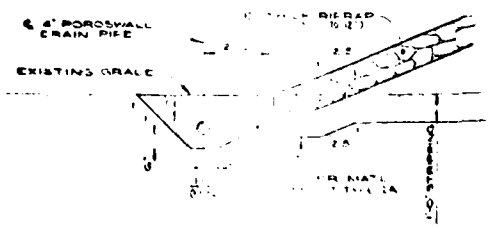
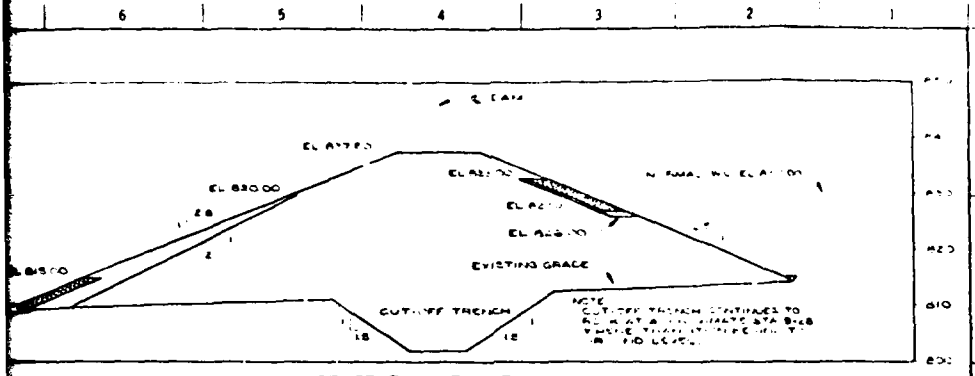


DETAIL "A"
SCALE 1"=10'





STATION 8+00
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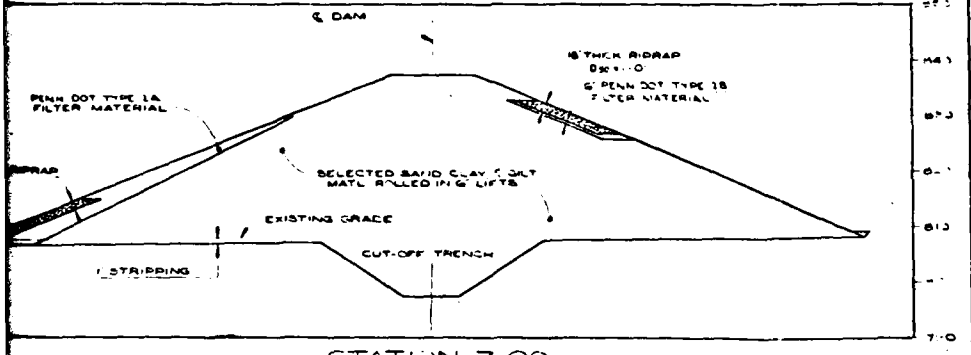

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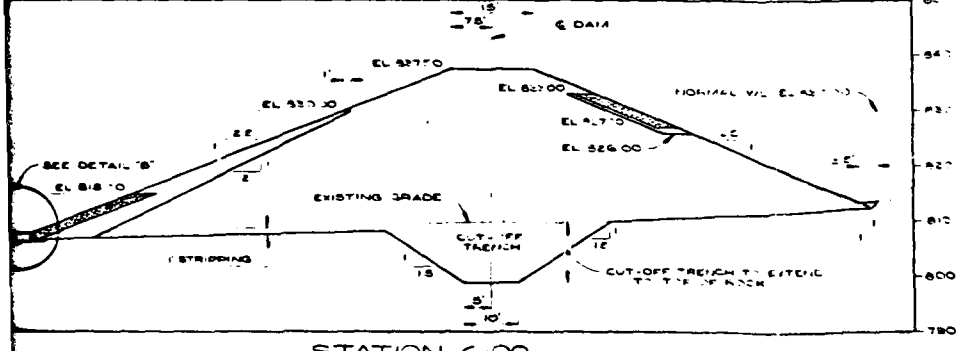

STATION 6+00
SCALE 1"=10'

REVISIONS			
NO.	DESCRIPTION	BY	DATE

CONSTRUCTION
PRELIMINARY NOT FOR CONSTRUCTION
DATE | RELEASED FOR | BY

HAWK MOUNTAIN CO. NO. 1
BOY SCOUTS OF AMERICA
CAMP METER & DAM CONSTRUCTION

LEEDY & PETERSON, INC.

CE 7190 D-615-004

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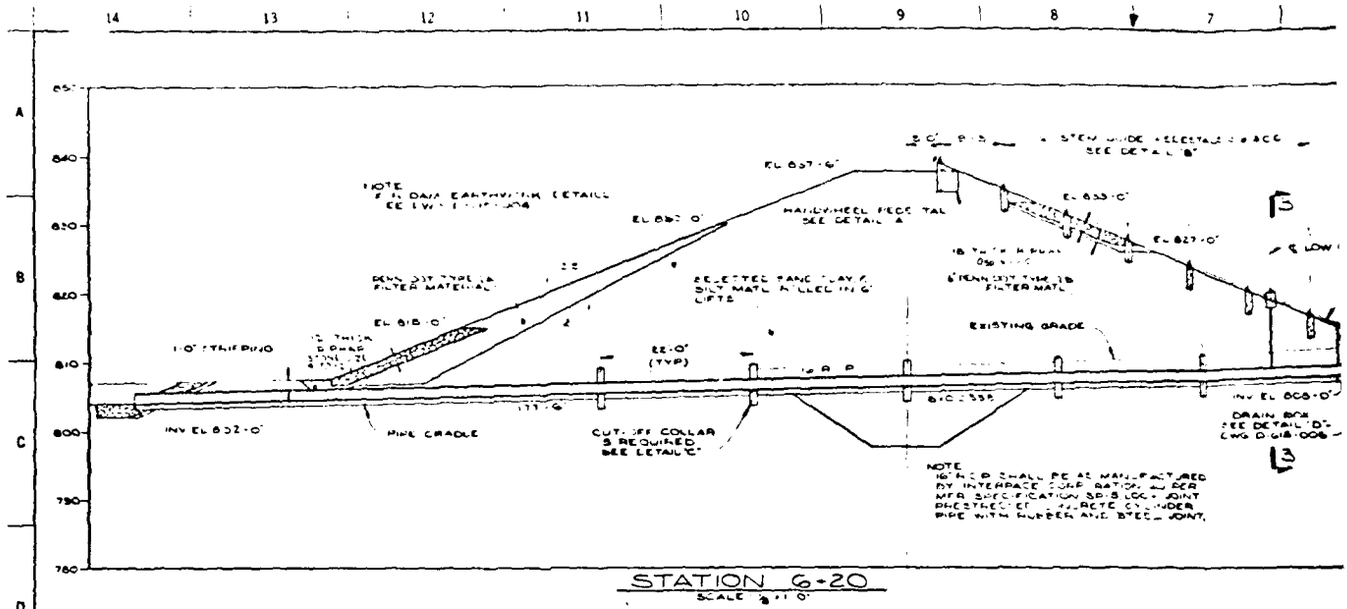
NATIONAL DAM INSPECTION PROGRAM

HAWK MOUNTAIN DAM
BOY SCOUTS OF AMERICA

SECTIONS

JULY 1980 PLATE E-3



STATION 6+20
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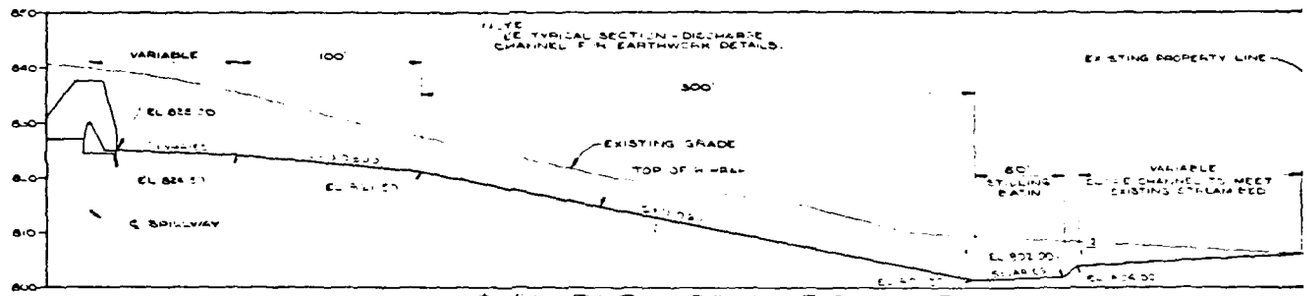
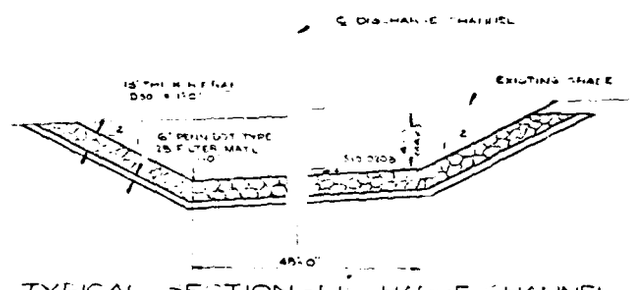
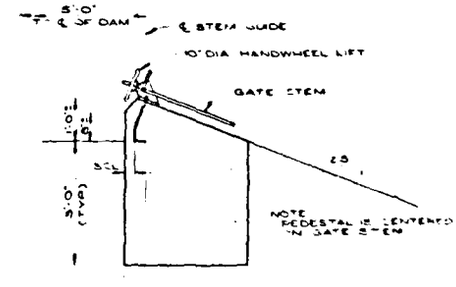


℄ RHUFILE - DISCHARGE CHANNEL
SCALE 1" = 10' HORIZ 1" = 10' VERT



TYPICAL SECTION - DISCHARGE CHANNEL
SCALE 1" = 10'



DETAIL 'A' - HANDWHEEL PEDESTAL
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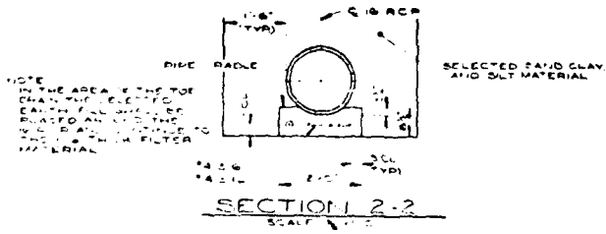

SECTION 2-2
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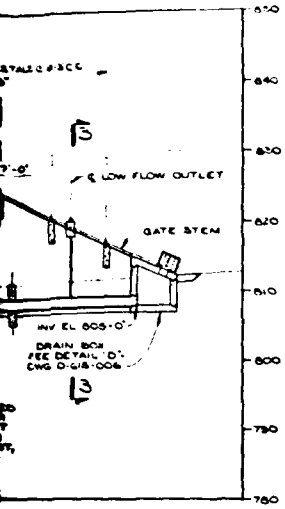

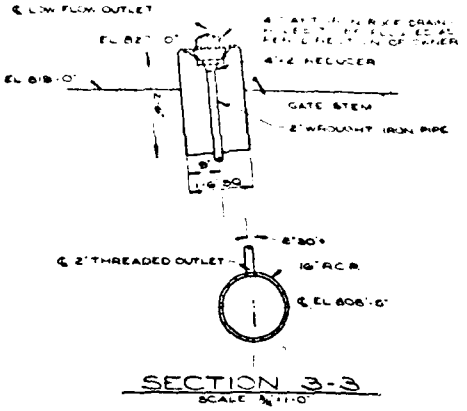

SECTION 3-3
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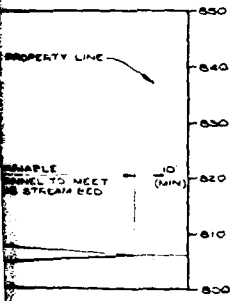
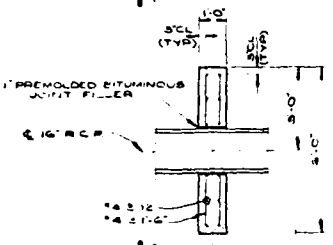
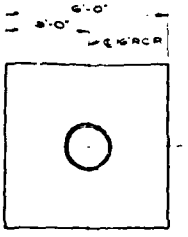
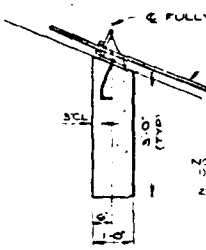




DETAIL "C"
CUTOFF COLLAR
SCALE 3/8"=1'-0"



ELEVATION 4-4
SCALE 3/8"=1'-0"



DETAIL "B" - STEM GUIDE PEDESTAL
SCALE 3/8"=1'-0"

NOTES
1. [illegible] IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS

REFERENCES
[illegible]

MADE RECORD CHANGES AS CONSTRUCTED, 6-14-82
REVISIONS

PHASE I INSPECTION REPORT
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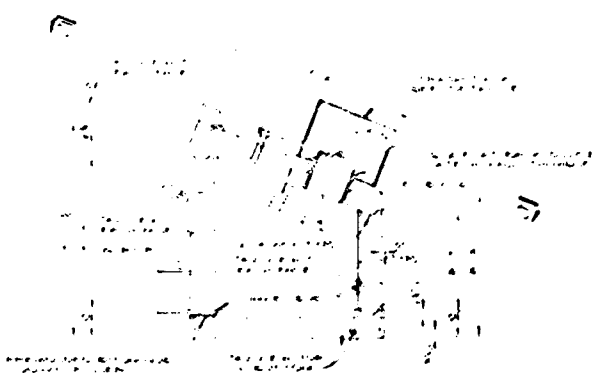
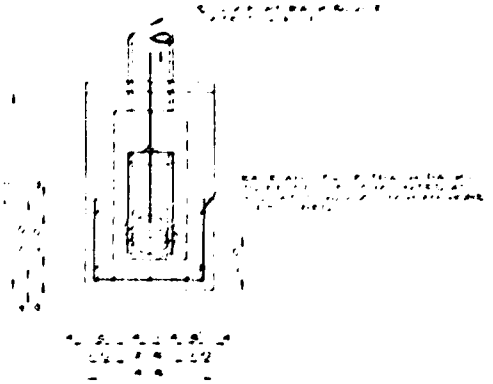
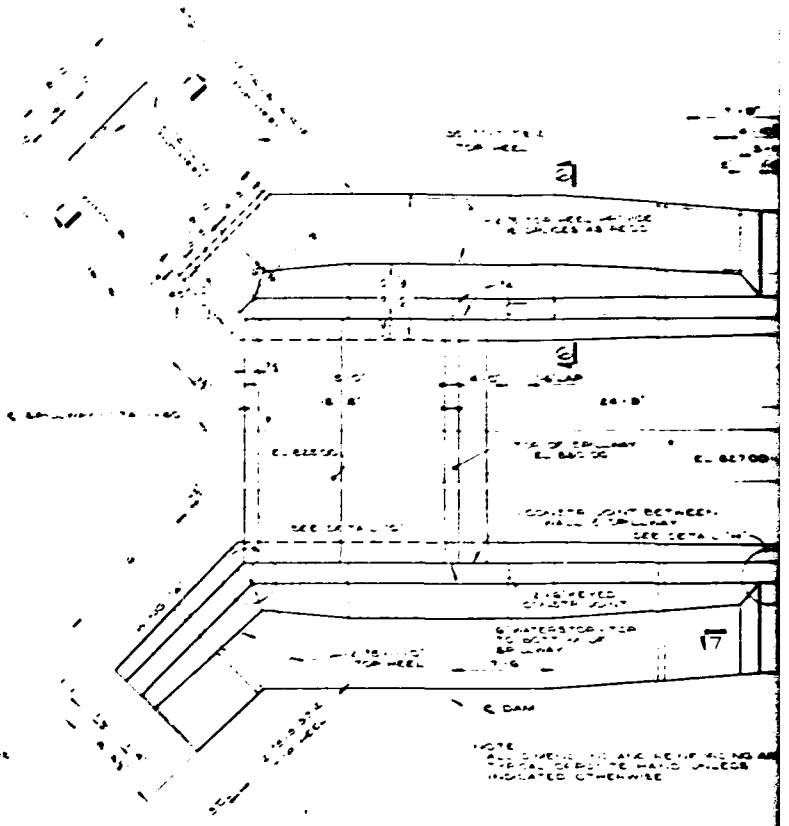
BOY SCOUTS OF AMERICA

OUTLET WORKS

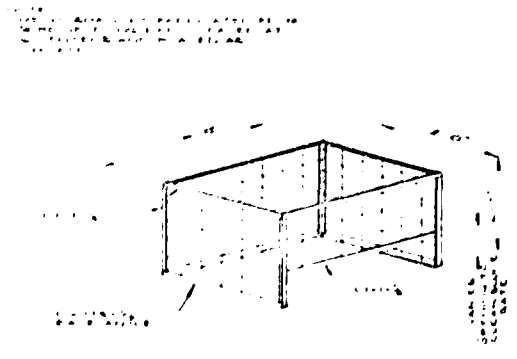
JULY 1980 PLATE E-4

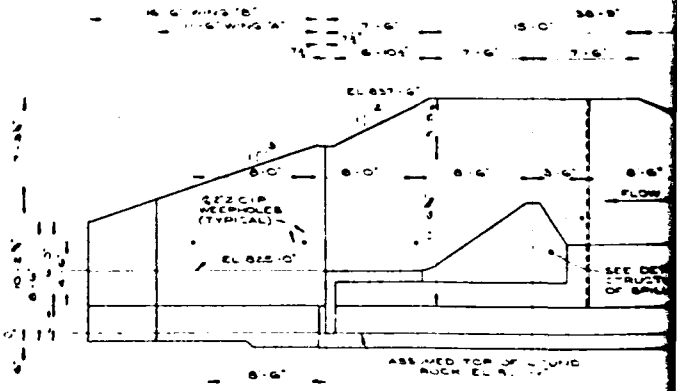




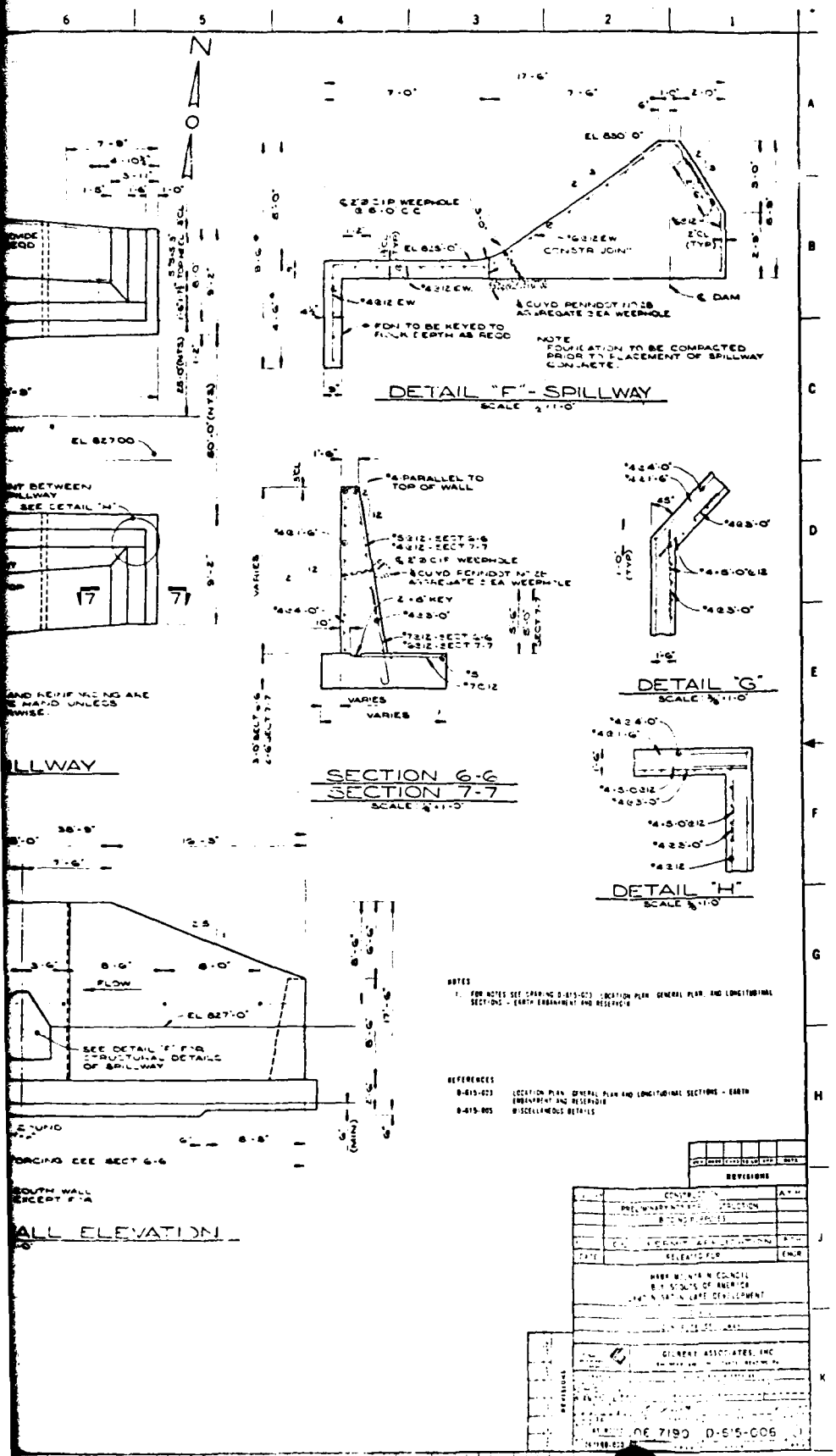


ENLARGED PLAN SPILLWAY





TYPICAL SPILLWAY WALL ELE



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HAWK MOUNTAIN DAM

BOY SCOUTS OF AMERICA

SPILLWAY

JULY 1980 PLATE E-5

APPENDIX F

GEOLOGY

HAWK MOUNTAIN DAM

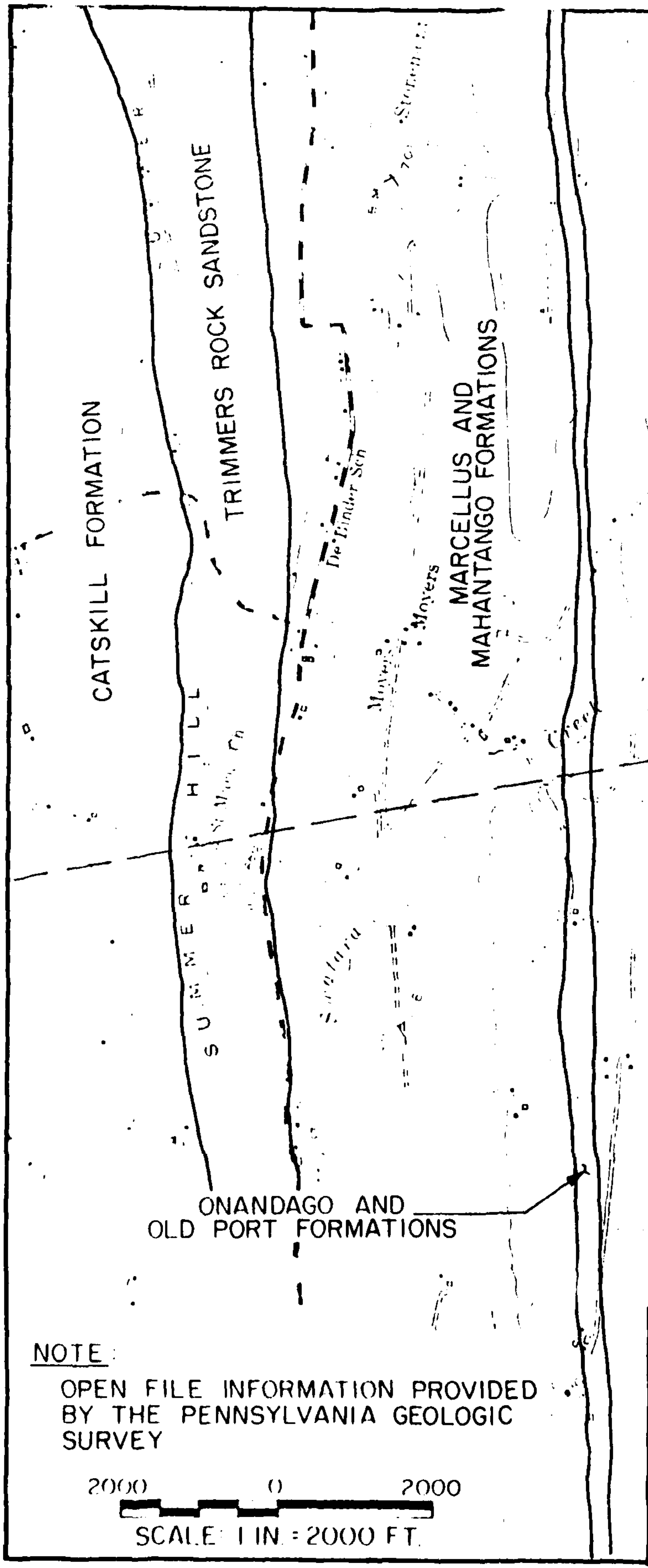
APPENDIX F

GEOLOGY

Hawk Mountain Dam is located in Schuylkill County within the Appalachian Mountain section of the Valley and Ridge Physiographic Province. Although no bedrock was observed at the dam site, the foundation exploration shown on Plate E-2 indicates that the bedrock consists of sandstones, siltstones, and shales, which are part of the Upper Silurian Bloomsburg Red Beds.

The bedding is folded into the broad, open Pine Grove Syncline, which trends N 70° E. The dam is located on the northwest dipping limb of the syncline.

The only known fault in the immediate vicinity is the Applebee Fault, which is located over a mile to the south within the Middle Silurian Rose Hill Formation. The direction of the fault parallels the northeast-southwest trend typical of structures within the Valley and Ridge Province.



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NATIONAL DAM INSPECTION PROGRAM

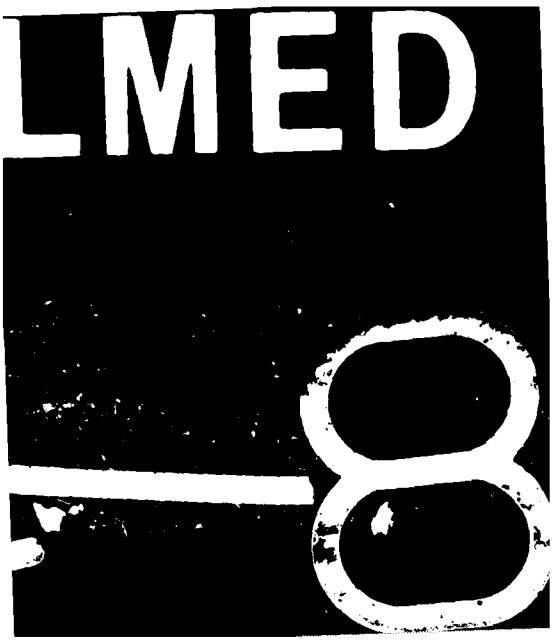
HAWK MOUNTAIN DAM

BOY SCOUTS OF AMERICA

GEOLOGIC MAP

JULY 1980

EXHIBIT F-1


LMED
8